

# GRAPES

AND

## HOW TO GROW THEM.

*An  
Illustrated Guide.*



LONDON :


The "Amateur Gardening" Office, 148 & 149, Aldersgate St., E.C.

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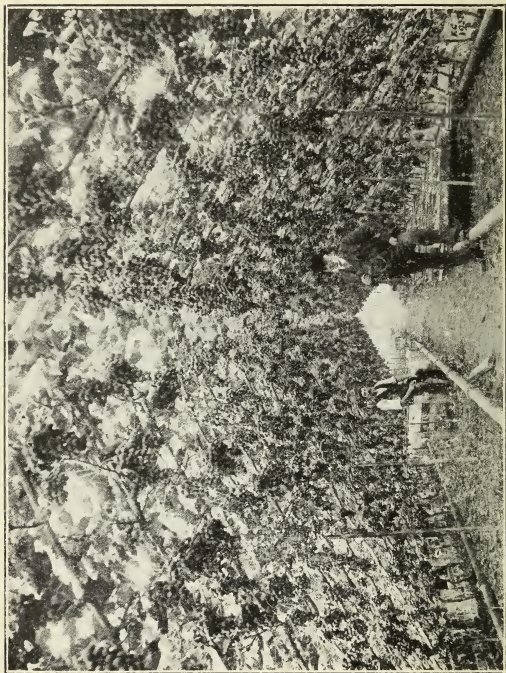








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A FINE CROP OF GROS COLMAR GRAPES.

# GRAPES :

## AND HOW TO GROW THEM.

A Handbook dealing with the History, Culture, Management, Propagation, and Insect and Fungoid Enemies of the Grape Vine in Vineries, Greenhouses, or the Open Air.

BY

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ILLUSTRATED.

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SECOND EDITION.

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## FOREWORDS.

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THERE are many thousands of persons in the British Isles who are trying to cultivate the grape vine in greenhouses, vineries, and outdoors, but who have hitherto failed to attain the success they would like, owing to the want of technical guidance as to the correct methods to pursue in the important operations of planting, forming the borders, disbudding, training, and so on. And there is doubtless an equal number of other who are desirous of making a start in grape-growing, but do not know how to proceed. Anyway, in our capacity of Editor of "Amateur Gardening," we have constantly had the foregoing facts brought before us, and we have come to the conclusion that if a cheap and reliable handbook on the subject were prepared and published, to meet the requirements of the small grower more particularly, it would meet with a hearty reception.

We have, therefore, with the assistance of an able gardener and experienced grape grower, Mr. J. Lansdell, F.R.H.S., prepared the present volume in a manner that we trust will prove helpful not only to the amateur grower of one or two vines, but also to gardeners who have had only a limited experience—and there are many single-handed gardeners to whom this expression applies—in grape culture.

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The needs of the amateur grower have been specially considered, consequently he will find information in this volume on many points not dealt with in previously published works on the subject. If he only strictly follows the various hints, and especially those given in the chapter devoted to the "Doubts and Difficulties of Grape Growing," he will experience fewer failures in cultivating the vine in future than in the past.

The monthly calendar of operations should prove very helpful to the grower, as there Mr. Lansdell has concentrated into a small space all the principal points about culture and management in their proper seasons.

Mr. Lansdell is responsible for all the cultural information in the volume, the remaining details, such as the "History of the Vine," "Bleeding of Vines," and the "Doubts and Difficulties of Grape Growing," being furnished by ourselves in order that the work should be as complete and useful as the limited sphere of a shilling handbook would permit.

In issuing a second edition the opportunity has been embraced of revising the text where necessary, and supplying additional information with regard to the pests of the vine. The volume has, as far as possible, been brought fully up to date.

T. W. S.

London, 1909.





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# GRAPES:

## And How to Grow Them.

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### CHAPTER I.

#### HISTORY OF THE VINE.

THE grape vine (*Vitis vinifera*) belongs botanically to the Nat. Ord. Ampelidaceæ, and, strange as it may seem to those unacquainted with botanical matters, is a relative of the Virginian creeper, which is really a species of *Vitis*, and not of *Ampelopsis*, as it is so generally credited to be.

As to the native country of the grape vine, this is more or less shrouded in mystery. It has been cultivated by man from the very earliest period, and hence its native country does not appear to be known with certainty. As, however, frequent references appear to the grape vine in Holy Writ, it is probable that Syria may have been its country of origin. Anyway, wherever it may have originated, men of all ages have paid a glowing tribute to its virtues for yielding exquisite wines, and in more modern times lovers and cultivators of luscious fruits have not been less enthusiastic in their admiration of its fruits for dessert, or in their desire to cultivate it successfully.

The earliest reference to the grape vine appears in the Book of Genesis, where we learn that "Noah planted vineyards, and made wine." Mention is also made of it in other portions of Holy Writ, so that it would appear that the vine was regarded as a fruit-yielding plant of the highest importance in those remote times. The Grecians and the Romans also cultivated the vine extensively.

So far as the culture of the grape vine in Britain is concerned, we have no reliable data to show when it was first introduced here. Some authorities consider that the ancient Phœnicians may have first brought over vines with them when visiting this island for tin. Others, again, are of opinion that we owe its introduction to the Romans when they occupied this country. It appears that the Emperor Probus, about 280 A.D., may have been the means of introducing the vine here, as he did much to encourage the culture of all kinds of fruits and agricultural crops during his reign. In early Catholic times, when monasteries flourished in this country, the monks were very partial to horticultural and agricultural pursuits, and busied themselves in planting vineyards in various parts of England. The historian Bede alludes to the existence of several in his day, the eighth century. The Isle of Ely was known at the time of the Conquest as the Isle of Vines. Malmesbury, too, mentions the county of Gloucester as being in his time famous for its rich vineyards. After the overthrow of the monasteries by Henry VIII., and the gradual importations of foreign wines to this country, the interest in the maintenance of vineyards seems to have waned, and the vineyards to have totally disappeared, nothing now remaining to indicate their former existence except local names in various parts of the country.

Some years ago an attempt was made by the Marquis of Bute to revive the culture of vines in open-air vineyards. He planted a large area of land with vines at Castle Coch, in South Wales. These are grown on the same principle as those in Continental vineyards, i.e., with one short stem trained to a stake. We believe some very good wine has been made from the grapes so grown, but whether the

experiment continues to be a practical success we cannot say. In any case grapes for wine-making can be grown so much better on the Continent that it is doubtful, apart from climatic difficulties, if the industry would be a commercial success in Britain.

Ever since the introduction of glasshouses in the eighteenth century grape vines have been grown to great perfection in this country. So long ago as 1781 it is recorded that the then Duke of Portland grew a hundred kinds of grape vines in his vineries at Welbeck. One of the bunches grown that year weighed 19½lb., was four and a half feet in circumference at the shoulders, and 21¾in. in length. This handsome bunch was carried on a staff by four labourers, in pairs and turns, a distance of twenty miles, as a present from his Grace to the Marquis of Rockingham.

The famous vine at Hampton Court Palace was planted in 1769, and still continues to flourish, bearing annually an enormous crop of fruit. In one year it is recorded to have borne 2,200lb. of grapes. In other old gardens there are also vines of considerable age still in full bearing.

Grape vines are largely grown on walls outdoors, but it is seldom that they ripen their fruits thoroughly, or, indeed, bear even moderate crops. This is, in a measure, due to faulty cultivation and the selection of less hardy varieties. Our variable climate, again, is a great drawback to the ripening of the fruit. Given a warm, sheltered, sunny wall, a good hardy, free-bearing variety such as is recommended further on, and skilful and intelligent culture, it is possible to grow fairly heavy crops, and also to ripen the fruit.

Commercially, grape-growing for market has made immense strides during the last twenty years. Acres of glass houses are now devoted to the culture of vines in England, Scotland, and the Channel Islands, and it is possible to purchase fruit of excellent quality at a much cheaper rate than it can be grown on a small scale. Still, there is a good deal of pleasure to be derived from growing one's own fruit, and the art of doing so is not, after all, such a difficult business as it would appear.

Here also it may be interesting to the reader to know that the currant of commerce sold by grocers is really the dried berries of a variety of grape called the Black Corinth. The berries are the size of those of the ordinary black currant grown in gardens. They are gathered when ripe, and laid out thinly in wooden trays in the sun till they become dry; then are exported to this country. The Black Corinth grape is grown largely in Zante, Corinth, and the Ionian Islands. The dried muscatels and the raisins are also varieties of grapes, grown in Smyrna, Malaga, and Valencia, and from thence imported into Britain.

The largest, or rather the heaviest bunch of grapes produced under cultivation, and of which we have any record, was one grown by Mr. Roberts, gardener at Charlville, in Ireland, in 1877. This weighed 23lb 7oz. The variety was Gros Guillaume. If we remember rightly, soon after a bunch grown in Scotland was reputed to weigh 25lb., but we have no data at hand to confirm this fact.

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## CHAPTER II.

### VINERIES.

THE best aspect for a vinery is south, or a little towards the south-west; south-west being next, and then south-east. These remarks apply more to lean-to vineries, which are more adapted for the early forcing of vines. Span-roofed houses are best built with their ends facing north and south, or, what is better still, a little towards the south-west and north-east.

**Lean-to Vineries.**—The lean-to is the one most generally used for early forcing, because its high back wall shelters it from the cold north winds in winter and early spring,

and it receives the full force of the sun when the days are short, and the full force of its powers can be utilised to the best advantage. The sharper the angle, the better it is for very early forcing, but in this case much more care in ventilating is required to prevent the leaves and berries being scorched, because the sun shines so much earlier on a steep roof than on a flat one. Moreover, the sun shines more directly on a steep than a flat roof at midday, and this fact is of great importance in the case of early forcing. In this

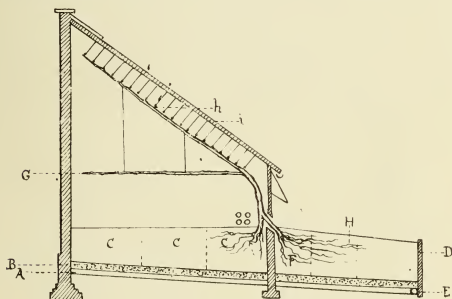


Fig. 1.—A LEAN-TO VINERY.

Explanation: A section of a lean-to vinery, showing border inside and out, also position of roots and main rod of vine. A is the natural soil; B the concrete; C, C, C, showing where the border is made up in sections as advised in text; D, the outer wall; E, the drain outlet; H, surface of outside border; G, the vine lowered till growth begins; h, i, the trellis.

case careful ventilation is required early in the morning on cold, bright days in early spring, and great judgment is also needed about midday, when changes from cloud to sunshine happen so frequently. A vinery built with an angle of 40 degs. is a very acute angle, but it enables a practical man to get his grapes ripe much earlier than with a house of a less acute angle. The vine-rod in such a house must be suspended from the roof with strings, as shown in Fig. 1 (G), until the young shoots have made at least one foot of growth. If not

done thus, the sap, owing to the high temperature, flows so freely to the top that the lower buds do not start into growth, or if they do so they remain very weak. A house built at an angle of 30 degs. is the most generally useful if the grapes are not wanted especially early. A house built at an angle of 25 degs. is preferable when it is to be used for a vinery and greenhouse combined, and also for late grapes. For very early forcing a house from ten to twelve feet wide is the most suitable, but for later grapes, and also for a greenhouse and vinery combined, a house from fifteen to sixteen feet wide is the most suitable.

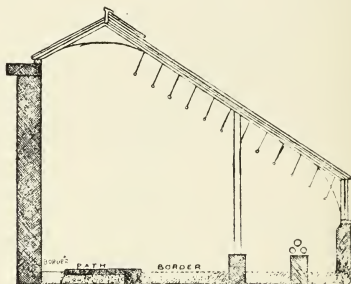


Fig. 2.—THREE-QUARTER SPAN VINERY.

Explanation: A section of a useful form of vinery with border inside only.

All vineries should have both front and top ventilation, the latter being on the roof. Both should run the whole length of the house, and be opened by machinery, so that half-an-inch only can be put on and be graduated from that up to the full width, which should be about eighteen inches.

Painted galvanised wires should be stretched from one end of the house to the other, which should be passed through the eyes of pins from sixteen to eighteen inches long, as shown in

Figs. 1 and 2. These pins should be screwed into the rafters nine inches apart. The wires are much more convenient than if fixed at a greater distance, for tying the young shoots down to.

**Three-quarter Span-roof Vineries.**—This kind of house should face due south. It is not so useful for early forcing as the lean-to, because the half-span on the north side exposes it to the north winds, and the house cannot be kept as warm without using much more fire heat. This is a very useful house (see Fig. 2) for general purposes, and can be used for early forcing more satisfactorily than a span-roofed house. Where there is already a wall of medium height, with a south aspect, it is often better to build a three-quarter span-roofed house on to it than to build the wall high enough for a lean-to. It also has an advantage in admitting more light, and the vine-rods have a longer range than in a lean-to. There should be front and also top ventilators on each side, because the top ventilators on the north side cannot be opened when the wind is blowing cold from that direction, when the vines are growing, without causing a chill; but the ventilators on the north side are necessary in the hot summer weather. The ventilators should run the whole length of the house, and be opened by machinery, the same as advised for the lean-to houses. The wires should also be fixed in the same way.

**Span-roofed Vineries.**—This type of house costs more than a lean-to house which is built against an existing wall or building in the right position. This is perhaps the best form of house for mid-season and late grapes, and is the one most generally used for growing grapes by the market gardeners. Span-roofed houses should run from north to south, so that they may get the sunlight from early morning until sunset in summertime. In this case the sun at midday, when at its full power, shines on the ends of the houses, consequently the leaves and berries are not so liable to be scorched, if air be admitted early in the day and not taken

off too early in the afternoon. It is, however, better when the ends of the houses run from a little towards the south-west and the same towards the north-east, because the sun is a trifle more powerful just after midday. They also get more benefit from the rising sun, as well as rather later in the afternoon than when the ends are due north and south. The walls for the sides and ends should be nine inches thick, and the front wall of the lean-to be of the same thickness. We are aware, however, that there are plenty of vineries which only have the walls four-and-a-half inches thick; but they are often more expensive in the end. When a wall

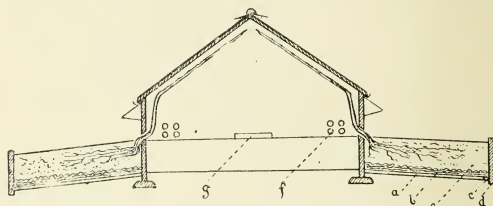


Fig. 3.—A SPAN-ROOF VINERY.

Explanation: A section showing outside borders on each side, with vines planted outside only. A, is the drain; b, the concrete; c, the compost; d, the drain outlet; e, the boundary wall of the border; f, the hot-water pipe; and g, the path.

bulges or tumbles the house itself suffers in comparison, and it is a rather difficult business to get it right again. When vine borders are made inside as well as outside, the walls must be built on arches to permit the roots going outside. Span-roofed houses which are built as tenant's fixtures must be constructed of wood only, and such houses need not have glass placed there, although it is undoubtedly better to have glass in the lower sides where the house is used for plants as well as vines. The upper board may be hung on hinges at the top, which should be opened the whole length of the house by machinery; and the cost would be much less than having glass ventilators in the front. The ventilating board

should be not less than a foot wide, so that an abundance of air may be admitted in hot weather. See Fig. 3.

**Heating Vineries.**—One of the commonest mistakes made is to have an insufficient amount of hot-water piping to keep up the temperature required. Insufficient piping is the frequent cause of such ailments as red spider, rust, and scorching. The additional cost of fire heat and labour in stoking, also the greater strain upon the boiler in driving it at such an excessive pace, very soon surpasses the cost of additional pipes at the commencement. A lean-to vinery twelve feet wide should have four rows of four-inch pipes along the front and both ends. A span-roofed house sixteen feet wide should have the rows of pipes along both sides and round one end if the grapes are expected to be ripe at the end of June. Mid-season and late houses, which are not likely to be used for other purposes, will only require two rows of pipes on each side.

**Steaming Trays.**—These should be fixed on all the flow pipes in vineries for the purpose of maintaining a moist atmosphere at all times when fire heat is used. When the pipes are heated, a moist, genial vapour is thrown off, which counteracts the dryness of the air due to the use of artificial heat. The practice of throwing water on the pipes is not a good one; it only fills the house with hot vapour, which, suddenly rising among the young foliage and grapes, causes rust on the young berries; and the formation of warts or scorching of the young leaves. The pipes should not be fixed nearer than eighteen inches to the walls, so that the vines, when planted inside, may not be affected by being so near to them.

## CHAPTER III.

**VINE BORDERS.**

THE vine border is quite one of the most important items in grape-growing. Good grapes cannot be grown in an unsatisfactory border. There are persons who think that an abundance of either animal or chemical manures thrown into the borders is all that is required to produce a large yield of first-class grapes, whereas they are frequently the cause of failures in making vine borders. Abundance of plant food is absolutely necessary, but manures in a crude form are often injurious to the young roots which come in contact with them. We have known very costly vine borders to be made of rich composts which were much more unsuitable for vine-growing than borders of the natural soil would have been. In this case the vines failed to thrive satisfactorily until the roots had penetrated beyond the specially prepared border. These are lessons that are only learnt by experience, but which it behoves everyone to consider who may be contemplating making vine borders. The soil itself is not taken up as food by the vines, but only serves the purpose of a medium to hold the food until it is wanted in a sweet and wholesome condition. This must always be a consideration in the making of vine borders, so that the materials used may be real food, and not poison.

**A Simple Vine Border.**—Our first consideration will be of those natural soils that may be suitable, without having to make artificial borders, and which frequently exist in many gardens. A loamy soil, which is about half-way between a sandy and a clay soil, is generally considered the

most suitable. We have also found a gravelly clay which has been in cultivation as a garden for many years to be an almost perfect soil for grape vines. A gravelly subsoil, if there be a good depth of soil above it, will generally have good drainage and a sweet and wholesome root run on the surface. When either of the above-mentioned soils are in the garden there is no need to make expensive borders to replace them. What is wanted is a soil and subsoil sufficiently open and porous that air and water may pass through it, yet sufficiently retentive to hold food and moisture to supply the vines during the growing season. Pure sand or gravel immediately under the top soil is generally a failure in its natural state, but there are some exceptional cases of this kind where vines flourish satisfactorily. Soils of this description should have a heavy dressing of well-rotted manure dug into the top eighteen inches of soil, and thoroughly mixed with it. Shoddy is also a good manure for such soils, as it holds and retains moisture for a long time, and gradually makes the soil of a more durable character. A dressing of old lime, which has been slaked some months, should be put on the surface once a year, giving just sufficient to cover the surface. Lime is a very important item in grape cultivation, and vines cannot be grown successfully without it being in the soil in some form. Anyone can easily test his soil to see how much lime it contains, and will then know whether to add lime to his borders. To do this take an equal quantity of the natural soil from three or four different places in the garden, taking altogether three or four pounds. Mix well together, and rub it through a rather fine-mesh sieve. Take from this a quarter of a pound and put it into an iron shovel; place the shovel on a bright fire, and stir the soil about until it has burnt into a brownish-white colour. Now allow it to cool, then put it into a tumbler, pour sufficient water to make it into a thin paste, then pour into it half a teaspoonful of hydrochloric acid, and stir with a piece of stick. The amount of effervescing which takes place will show how much lime the soil contains. If there be little or no effervescing then lime must be freely used, but if much effervescing then no lime will be necessary.

**Manures for a Simple Border.**—Soils of a rather heavy character, if the subsoil be not clay and is naturally well drained, are often suitable for vine culture. To make such soils more suitable, sand, lime gravel, plenty of old

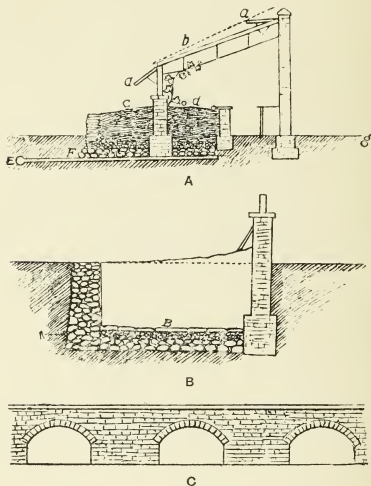


Fig. 4.—VINE BORDERS.

Explanation: A shows a border partly inside and out, for early vines. B, a border with a layer of stones on the concrete bed, another layer of smaller ones on top, covered by a layer of turves. The outside wall, too, is constructed of loose stones, as shown, instead of brick. C shows the type of arches used where borders are made inside and outside.

mortar broken to the size of small nuts, and burnt clay that has been burnt so that it will easily break into powder, is a very fine thing to mix with heavy soils for vine borders. No animal manures should be mixed with this kind of soil, but one pound of basic slag per square yard should be tho-

roughly forked into the upper layer; and this border may be expected to produce good crops of grapes.

Potash is very necessary for grape vines, but this will be supplied in sufficient quantity if burnt clay to a depth of six inches be spread over the top and thoroughly mixed with the soil. Wood ashes made from burnt garden refuse, hedge-trimmings, etc., is a suitable medium for supplying potash to light or gravelly soils, and a top-dressing thereof every winter to vine borders. Chalk also is very good for supplying lime to light soils, if broken to a powder. Phosphates are very important. Basic slag, as previously advised, will supply phosphates to the heavier soils. Bonemeal in a fine powder is the best form of phosphates to add to light or gravelly soils; this will also add nitrogen as well. Give one pound of the best bonemeal per square yard, and fork it in so as to thoroughly mix with the top foot of soil. It is very important that the soil, and also the ingredients which are to be added, should be in a fairly dry condition while being worked, or the vines will never succeed.

**Forming Special Borders.**—Where soils such as clay, sand, or gravel are in a bad condition, or the subsoil in a wet situation, it is not wise to try to improve them. Such an attempt would only end in failure, thus causing much time and money to be lost in the experiment. It is better to remove the soil, cement and drain the bottom, and form a new border with good material.

It is usual to form the borders, both inside and outside, with the walls built on arches for the roots to go outside as well as inside (see C, Fig. 4). Inside borders are an advantage when the grapes are forced early, because the roots are not encased in cold or frozen soil when new growth is commencing. When vine roots are wholly outside, forcing cannot be carried out so well as when they are partly outside and inside. In the latter case if the outside roots should be frozen the inside ones will not be so, and growth can go on more satisfactorily. For general purposes, and especially for amateurs, the outside borders (see Fig. 3 or 4, B) are by

far the best. Inside borders are usually made the whole length and width of the house, and the outside borders from ten to twelve feet wide; but it is very much better when the borders are made in sections of about four feet at the time. In either case the whole of the soil should be taken out three feet deep the full length of the house and twelve feet wide outside. The bottom should be made to slope to the outside of the border twelve feet from the front of the house (see H, Fig. 1). The slope should not be less than half-an-inch to the foot, and the bottom be made quite firm and even. A brick wall four-and-a-half inches thick should be built at the bottom of the border, twelve feet from the front of the house, as shown at Fig. 1, D; and also at the ends of the border, to prevent the roots going beyond the limits of the latter. A drain of ordinary three-inch pipes should be laid along the border against the wall, as shown at Fig. 1, E, or 4, E. This should be connected to a main drain to take the water away from the border. The bottom of the border should then be covered with three inches of cement and fine gravel mixed together. This should join the drain at the bottom and be level with the top of it. When the concrete is dry, six inches of drainage should be laid over it, using broken bricks and stones for the purpose. The largest, which should be about the size of one's fist, should be at the bottom, filling up with smaller sizes, and finishing off with the finest, or fine gravel. See Fig. 4, B.

**Compost for a Special Border.**—Turf should be procured from some fertile meadow or pasture. This can often be obtained where new buildings are to be erected, or from the sides of roads. There are often high places by the side of roads, where roadmen are glad to have it lowered. These high places are made by continually throwing there the scrapings from the road, which makes an excellent turf for vine borders. Turf should be cut or dug about four inches thick. The best time to cut is during frosty weather, or immediately after, because then the wireworms, slugs, and grubs go down deeply into the soil away from the frost. Turf

is more porous than cultivated soil, and is not often too wet for digging, excepting just after heavy rains. We have found no advantage in cutting and stacking turf some months beforehand for this purpose, as is so often recommended; besides, it is more expensive to do so. When a choice can be made, the best is a yellow turf, of a medium texture, which is about half-way between a sandy soil and a clay one. A layer of the turves should be packed close together, grass side downwards, over the drainage. The rest of the turf should be chopped from two to three inches square, and the following ingredients be mixed with it. To every eight loads of turf add one load of old mortar, free from wood or shavings, broken fine; half a load of wood ashes made from burnt garden rubbish, prunings, etc., and a quarter of a load of charcoal broken to the size of peas, adding the dust as well. Add also 50lb. of bonemeal to every ton of turf. No animal manure should be used, because this has a tendency to make large fleshy roots, and also renders the soil sour when it has decayed. The above ingredients should be thoroughly mixed together by turning the whole twice over.

**Making a Special Border.**—If the mixture is quite dry it should be trodden down as it is put on, but if at all wet it should not be trodden, but be made six inches higher to allow for sinking and for treading when it has become dry.

The border is much better made in sections four feet wide (see *c, c, c*, Fig. 1), because the roots are bound to fill that portion thoroughly first, and the growth made in that small portion first is firmer and better than when the roots have the whole border of rich plant food to grow in. Also, when a new piece of border is added it is fresh, sweet, and full of fresh plant food, which gives new life to the vines when they have got into full bearing. When making the border in sections, the walls, concrete, and drain should be made at the first, just the same as if the whole border were going to be made, but the drainage is only put in as far as the piece of border is made. A turf wall is made of unchopped turves four feet from the front of the house, and the space between the house and

the turf wall is filled up with the mixture, as recommended for the whole border. In two or three years the first portion should be filled with roots, when another four feet should be added in the same way, and the whole border can be completed when the last piece has been filled with roots. This method has another advantage in taking less material and

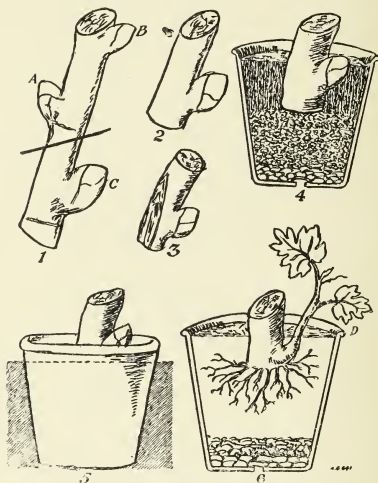


Fig. 5.—PROPAGATING VINES BY "EYES."

Explanation: A, B, and C are "eyes" growing on a ripened lateral shoot (1). 2 shows an "eye" off, and 3, its lower end slightly pared off. 4 and 5 show the way to plant the "eye" in a pot, and 6, the "eye" rooted and producing a shoot.

time before the vines can be planted. It will be seen by Fig. 1 there are three inches of concrete, six inches of drainage, and 2ft. 3in. of soil in the border. In cold, wet situations, and especially where the soil to be used is of a heavy

nature, it is sometimes better to only take from twelve to eighteen inches of soil out, so that the greater part of the border is above the level of the surrounding soil. A raised border is always warmer than one on the level. The surrounding walls need only be built just above the level of the soil; the remaining portion may be built with rough, large stones, giving it the appearance of a rockery. Small creeping rock plants may be planted in among the stones, and would not rob the roots of much nourishment. No plants or flowers should ever be permitted to grow in the other portion of the border. Plants and flowers growing on vine borders are frequently the cause of the grapes failing.

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#### CHAPTER IV.

### PROPAGATION OF VINES.

THE beginning of February is the best time to put in the cuttings, or "eyes." Anyone having a well-heated vinery, stove, or propagating house may very easily raise his own vines. Single "eyes" make very much better plants than those that are raised from cuttings five or six inches long.

**Preparing "Eyes" or Cuttings.**—The "eyes" should be selected from well-ripened wood, cut off nearly close to the parent rod, and the wood is best procured from vines which have ripened their fruit before the end of August. The wood should be cut into "eyes," as shown in Fig. 5, *a*, *b*, and *c*. These are then inserted singly in three-inch pots. Light turfy loam should be pulled into small pieces, and mixed with an equal quantity of silver sand, adding also a little charcoal dust. This should be pressed down, but not firmly. A hole should then be made with the finger in the centre of the soil

in the pot, large enough to take the "eye," so that the bud is just below the level of the soil (see Fig. 5, 4). A little pinch of charcoal dust should next be put into the hole, and the "eye" then be pressed down into it. The soil should be pressed rather firmly above to prevent the "eye" rising up when root action commences.

**Striking the "Eyes" or Cuttings.**—The pots are best put into narrow boxes that will hold two pots aside, and cocoanut-fibre refuse (see Fig. 5, 5) should be packed round the pots to prevent the soil drying up so quickly. The box should then be put on a slate over the evaporating trough of the hot-water pipes, or it may be stood on the pipes with a slate under it. The cocoanut-fibre refuse should then be made thoroughly moist throughout, and be kept moist regularly. If the soil in the pots is dry it should be just moistened through a fine rose, giving only just sufficient to settle the soil around the cuttings. No more water should be given to the pots until growth has fairly commenced, the moist cocoanut-fibre refuse being sufficient to prevent the soil becoming dry. The box should not be covered with glass, because it is desirable to keep the top cool so as to induce root action to commence as soon as possible after the bud begins to grow. The bud has a natural tendency to start into growth when it is brought into heat, but if much growth be made before root action is formed, the stored-up sap will be exhausted, and the "eye" will die for want of nourishment. The young shoot will never make a good rod if it becomes stunted through waiting for root action to send up food for its growth.

**Potting the Young Vines.**—When the rooted "eyes" have made three or four leaves the pots should be examined to see how many roots have been made, and as soon as the pots have become fairly well filled with them, but before they have become potbound, they should be transferred to six-inch pots. The compost for this potting should be light turfy loam, broken up quite small, but the fine soil

from this should not be used. The turf should have mixed with it one part silver sand, one part wood ashes, half a part of charcoal dust, and a little fine bonemeal, to four parts of turf. Mix thoroughly together, and stand in boxes on the pipes, so that it gets quite warm before using. The pots should be thoroughly clean inside, and be carefully crocked with clean crocks. These should also be stood upon the pipes to get warm before being used. The compost should be pressed down moderately firm, using a flat stick for the purpose. After potting, stand the pots over the pipes on two thicknesses of slates, where the plants can have an abundance of light and sun, and be as near to the glass as possible. The young plants should be syringed three or four times a day in bright weather, moistening the pots as well as the foliage. Water must be given sparingly at first until the roots get into the new soil, but the soil must never be allowed to get dry. When the roots have got into the new soil the pots should be raised a little higher from the pipes. Where hotbeds of leaves and manure are put into early vine-ries it is a good plan to half plunge the pots in this after potting, until the plants have become established.

**Treatment of Young Vines.**—When the plants have filled their pots with roots transfer them into nine-inch pots. The pots should now be put on the stage in front of the house, and the young rods trained up the wires under the glass. All laterals must be pinched above the first leaf as soon as they are formed, and all tendrils removed. The points of the leading rod should be pinched out when it has grown seven feet, and all after-growths be pinched to one leaf. As soon as the leaves begin to turn yellow, all the side laterals should be cut off close to the young rod, taking care not to injure the buds at the base or the young leaves on the rod.

**Striking "Eyes" in Turves.**—There is another way of striking the "eyes," which in some respects is better than striking them in pots. Turves are cut about three inches thick from some good loamy pasture which has plenty of

fibrous roots in it. These turves have to be divided into portions, each six inches square. Boiling water is poured upon their grassy side to destroy both the grass and any insects which may be present. The turves are then laid upon slates, grass side downwards, and the slates placed upon the evaporating trays or on the hot-water pipes. When the turves have become moderately dry a hole is made in the centre of each turf large enough to hold the "eye," and half-an-inch of sand and charcoal-dust mixed together underneath it. The "eye" is then pressed into the hole, and a little soil placed over to make it firm, as shown at A (Fig. 6). Just sufficient moisture must be added to prevent the turf becoming dry until root action commences, after which more water must be

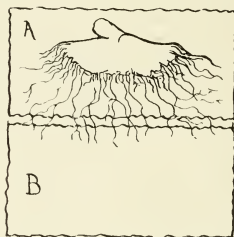


Fig. 6.—VINE "EYE" ROOTING IN TURVES.

Explanation: A and B are two turves placed one over the other for the "eye" to root into instead of in soil in a pot.

given. As fast as the roots come through the sides of the turf they must be cut off with a sharp knife; this causes them to produce a number of fibrous roots. When the whole turf becomes well filled with roots another turf the same size should be put under it (see B, Fig. 6). By the time this one is also well filled with roots, after having been treated in the same way as the upper one, the plant with the turves may either be put into a pot just large enough to hold them, filling in the crevices with fine soil, or into boxes a little larger

than the turves. A better plan still is to plant the rooted "eyes" with the two turves straight out into the soil where they are to remain in their permanent places (see Fig. 7). The roots require no disturbing when they are planted out, because they are not coiled round like those grown in pots, and most of the young roots are just ready to go out into the soil around them. Plants reared in turves always take to the new soil, and prove more satisfactory afterwards than those grown in

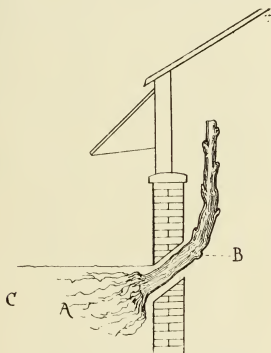


Fig. 7.—YOUNG VINE PLANTED.

Explanation: A are the roots of the vine (B) reared from the "eye" in turf and planted in the border C.

pots. The laterals should be pinched in the same way as advised for those in pots.

**Seeds.**—Grape vines are easily raised from seeds, but there is really no advantage in adopting this mode of propagation unless it be to rear new varieties as the result of cross-fertilisation. Vines reproduce themselves fairly true from seeds, but the quality of the fruit afterwards borne by the plants varies considerably. The seedlings are best planted

out where there is plenty of room for them to grow. They will bear fruit when three or more years old, and if this should be of a promising nature young plants should be reared from "eyes" and grown on in the usual way. The seeds may be

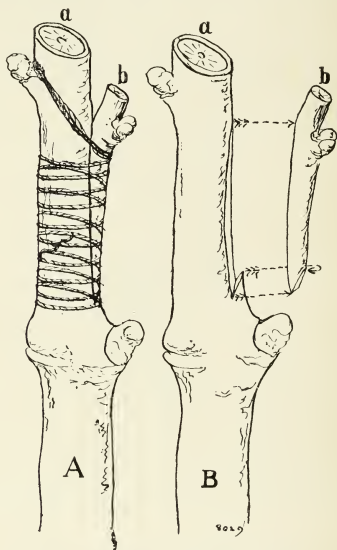


Fig. 8.—HOW TO GRAFT A VINE.

Explanation: A is the stock or old vine with the scion (b) properly secured to it. B, shows the scion (b) properly cut and in readiness to be fixed into the stock (a) as indicated by dotted lines.

sown in any good ordinary soil in a pot or pan in a cool or heated greenhouse, as soon as they can be secured from the ripe berries. Grow them singly in small pots, and grow on till a year old, then plant out. Seedlings are very shy in

fruiting if grown solely in pots. Many of the worthless and non-fruiting vines grown on walls outdoors are seedlings of indoor vines, which are quite unsuitable for the purposes.

**Grafting.**—A good deal of skill and experience is necessary to graft a vine successfully. The great secret is to ascertain the right time to do it. Generally speaking, it may be safely done when the first leaves are fully expanded. There is then little risk of injury by bleeding, and just enough free sap to quickly form a union between stock and scion. The

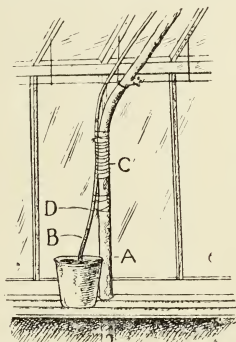


Fig. 9.—INARCHING A VINE

Explanation : A is the old vine and B the young one, to be joined A, C, to A.

scion, or graft (*b*), should be cut off in autumn, and be partly buried in sand or soil under a north wall outdoors. Leave it there till a week before grafting, then bring it into heat to slightly excite growth. The grafting is done as follows: First take a slice off the stock or old vine, and make a slight notch in the upper part, as shown in stock (Fig. 8, B). Next take a similar slice off the side of the scion, and make a tongue in the upper part

of the cut. The scion should have one bud only, not two or more as in ordinary scions of fruit trees. Now fit the tongue of the scion into the notch of the stock, and see that the inner part of the bark, called the cambium layer, exactly fits on one if not both sides. This is very important to ensure the union of the two cambium layers and the formation of new cells to allow sap to pass from one to the other. Having fixed the stock and scion accurately, bind the two with raffia (as shown in Fig. 8, A), and then cover with grafting-wax,

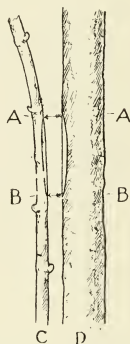


Fig. 10.—DETAILS OF INARCHING.

Explanation C is the young vine rod, and D the old one. A slice has to be taken off each as indicated at A, A, and B, B, and the two joined as shown in Fig. 9.

such as is sold in tins by all sundriesmen. About six weeks afterwards the union of stock and scion should be complete, when the wax and raffia may be removed.

**Inarching.**—This is a simple method of grafting one vine on another, and is practised when it is desired to utilise an old or a worthless vine as a stock to grow a superior sort upon it. The vine which has to be inarched to the old one

must be grown in a pot (Fig. 9, B). The two have then to be placed close together, and at a convenient spot a slice has to be taken off the side of the old and young vine (see AA and BB, Fig. 10). The parts so cut have then to be brought together, taking care that one side of the cut on the stock and the young vine exactly fit. The two have next to be firmly secured by means of raffia (see Fig. 9, C), and left thus till a perfect union has taken place, when the young vine has to be severed just below the union (see Fig. 9, D), and the raffia removed. The best time to do this is when the first leaves have fully expanded; then there is no risk of injury to either vine by bleeding. A young growing vine may be inarched in a similar manner to the young shoot of an old vine when both are in full growth. See also method illustrated by Fig. 11.

## CHAPTER V.

### PLANTING VINES.

It is a very easy matter to plant those grown in turves when the border is inside the house, but there is some little difficulty when planting outside to get the young rods through the holes without breaking some of the leaves, unless the holes are large ones. But this can be easily done after the leaves have fallen.

**Best Time to Plant.**—Generally speaking, about the end of August is the best time for planting vines which have been grown in turves at home. It is best to wait until the wood has changed to a brown colour at the bottom, if that part will be shaded from sun and light by the front wall, because it is very important to have well-ripened wood

before winter. In that case, it is better not to wait until the end of September, but to plant at the end of August where the vines will be freely exposed to the sun's rays. The vines in the turves should have a hole dug in the border just large enough to hold the roots and turves, so that about an inch of soil may be put on the top. The turves should be in a thoroughly moist condition before planting. The end of

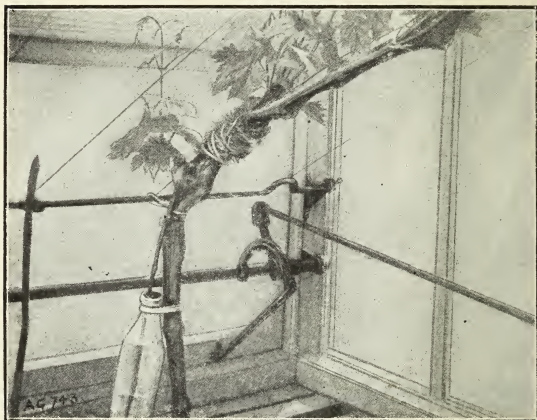


Fig. 11.—WATER METHOD OF INARCHING VINES.

Explanation: This plan differs from that illustrated by Fig. 9 in having the lateral cut off and one end inserted in a bottle of water to keep it fresh till a union is effected with the stock or old vine. The details otherwise are the same as described for method illustrated by Fig. 9. (Photo: H. A. Smith.)

September is a good time to plant home-grown pot vines, because it is necessary to partly shake the soil away from them, and disentangle the roots and spread them out. If the latter precaution be not taken the roots are often a long time in getting into the surrounding border.

**Planting Home-Grown Vines.**—The hole should be dug out wide enough for the roots to be spread out their full length. Care must be taken in disentangling the roots so that as few as possible are broken. The soil in the pots should be rather dry before planting, so that it can more easily be taken away from the roots, but the latter should not be exposed to the drying sun and air longer than is absolutely necessary for the work to be done. Cover the roots with about two inches of leaf-mould, without any sticks in it, and water through a rose at a temperature of 150 degs.; then cover with soil from the border to a depth of four inches. The leaves of the vines should be kept moist all day by syringing for a few days, gradually giving less for another week, also shading from the midday sun; after which time neither shading nor syringing will be needed. If the border be moist at the time of planting, very little water will be required after, but the roots must not be allowed to suffer from want of moisture.

**Planting Purchased Vines.**—In places where the young vines cannot be grown from “eyes” or cuttings, they should be obtained from a reliable nurseryman in November, and then be pruned back so that when planted the top bud is just above the bottom pane of glass in the vinery, in order that full light may reach the young shoots when they begin to grow. Stand the pots in a house or frame where there is no fire heat, and the soil in the pots should only be kept just moist during the winter. The best time for planting is when the buds have just burst, from the end of February to the end of March, according to the season. The soil in the pots should be allowed to become rather dry, in order that it may be more easily shaken out from among the roots without injuring them. The roots should then be carefully disentangled and spread out, and if they are to be planted in an outside border the cane must be put carefully through the hole left in the brickwork for that purpose. A hole should be dug in the border six inches deep, along close to the front of the house, and the roots be spread out each way

near the house, and not down towards the bottom part of the border away from the house, because it is particularly desired that the part near the house should be first well filled with roots. The roots should be covered with a little fine leaf-mould in which there is no rotten sticks. If the border be inside give sufficient water to moisten the roots and soil around them at a temperature of 150 deg., and cover with the soil of the border. It is better not to water when they are planted in an outside border at this time of the year. The soil is best left loose above the roots for a few days if water has to be applied after planting, in which case tread firmly afterwards.

**Watering Newly-planted Vines.**—If the soil in the inside border be in a moist condition at the time of planting it should not require water until the shoots are a foot long, because the constant syringing should prevent it drying at this early season; but when water is required it should be given at a temperature of 150 deg. the first time, and only just sufficient applied to thoroughly moisten the soil for a few inches downwards.

Those planted outside should not be watered until the soil has become rather dry, and this will depend more upon the weather than the length of time they have been planted. As a rule water is not wanted outside until from the middle to the end of May. The water then should be warm, and enough should be given to thoroughly moisten the soil. A mulching of about four inches thick of half-rotten manure should be put on immediately after watering. The borders inside should have a mulch about the beginning of May, both for those planted in autumn and in spring.



## CHAPTER VI.

**FIRST YEAR'S GROWTH.**

AFTER the vines have been planted in the spring the house should be kept as cool as possible, and the vines syringed in the afternoon of bright days. A little ventilation should be given before the sun shines upon the house.

**Disbudding and Stopping.**—When the shoots have made six leaves remove the points from all excepting the leading one, that is to form the rod, and all sub-laterals should be stopped above the first leaf. No attempt must be made to tie any of the young shoots down to the wires at first, or they will be sure to get broken off; but they must be prevented from touching the glass by a piece of raffia, which should be tied near the point and then slung to the wires, this being repeated as required. When the leading shoot has grown six feet the point should be taken out, and all the side shoots pinched above the first leaf, excepting the top one, which should be allowed to grow on to continue the new rod. This pinching causes the buds on the lower part of the new growth to plump up, and also assists the lower shoots to become stronger.

**Autumn and Winter Pruning.**—All the new growths on the leading shoot should now be allowed to grow unstopped until about the middle of September, after which time no new leaves should be formed. Any further growths that form should be pinched off. If the vines have grown well they should have filled the whole house by this time, and may even have become too thick. When this is the case some of the side growths should be cut back by the beginning of October, cutting off some two or three feet from each. This

helps to store up more sap in the back buds, and checks late root action, which is better for the vines than when root action is vigorous late in the season. The shoots should be cut further back the middle of October. The leaves should fall early in November, and the winter pruning may be done by the end of the month, when all side shoots should be cut back to the main rod, and the lead-

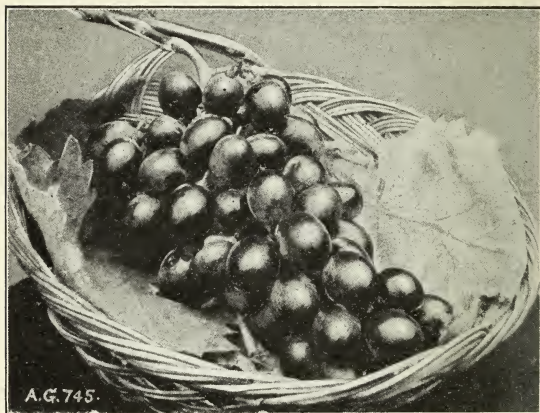


Fig. 12.—LADY DOWNES' SEEDLING.

A bunch of a good late grape. See p. 70.

ing shoot or rod be cut back to from three to four feet from the base, according to its strength. The weaker rods should be cut back to three feet, or less if very weak, and the strongest may be left four feet long. If a greater length than this be left there is a danger of the side growths or spurs near the bottom becoming too weak to bear good fruit in the future, and no after treatment will remedy the evil.

**Winter Treatment.**—No fire heat should be used during the winter unless required to keep out frost in severe weather. When fire heat is used immediately after pruning it is almost sure to cause bleeding in young vines, although well-ripened canes are not so liable to bleed as those not so well ripened, and vines pruned the end of November are not so liable to bleed as those pruned in January or later. If the vines have been attacked by insect pests during the summer they should have a dressing of Gishurst Compound as soon as they have been pruned, using six ounces to each gallon of water, working it well in all the crevices and around the buds with a half-worn-out paint brush. The tops of the canes should then be all tied back to the front wire. This modifies the flow of sap when it rises, so that the top part does not get more than the lower part, and helps the buds to break more evenly the whole length of the young rod. The woodwork of the house should also have a good washing with Gishurst Compound or paraffin emulsion, and the walls be washed with fresh lime, in which some flour of sulphur has been added. The outside border should have a mulching of rather long strawy manure the end of November, which helps to retain the warmth, and prevents it becoming frozen. This assists the roots to make active growth when the vines are started in February.



## CHAPTER VII.

**SECOND YEAR'S GROWTH.**

THE vines may be started about the first week in February, and we think the old-fashioned system of having a hotbed of leaves and manure is still the best. The leaves and manure should be thrown together in a heap outside first, throwing it up into a high cone shape to get it to heat quickly. When steam begins to come out turn it over inside out, and as soon as steam is seen again take it into the vinery, making a mound three or four feet high and the same in width, the whole length of the house. This will give off a gentle heat and moisture, which are just what the vines require. Keep the house to 45 deg. the first week and to 50 deg. the second week, with a rise to 60 deg. by sun heat. The vines should be syringed twice daily if manure is used, and four times a day if no manure be used, until the buds burst. The hotbed can be made very useful for starting plants into growth, such as azaleas, bulbs, spiræas, deutzias, etc.; also striking cuttings and raising seedlings, all of which will come healthier than by other means. The ammonia rising from the manure is very beneficial both to vines and plants. Inside borders should be examined with a trowel to a depth of eighteen inches, in two or three places, and a soaking of warm water must be given if the soil is in the slightest degree dry. The temperature at night should be continued at 50 deg. until growth commences, when it should be raised to 55 deg., and to 75 deg. in the day by sun heat. If no hotbed be used inside, the border should be just pricked over with a fork about two inches deep, and a mulching of fresh stable manure spread over its surface to prevent the border becoming dry by evaporation. The walls and floors should be thoroughly syringed

in the morning before eight o'clock, and also in the evening when the house is closed. A little ventilation should always be put on the top just before the sun shines upon the house. This should be made the rule throughout their growth.

**Disbudding, Stopping, and Training.**—When the young shoots have grown a few inches long, the rods should be tied upright to the wires, in their proper position. The buds on strong young rods will often be double, pro-

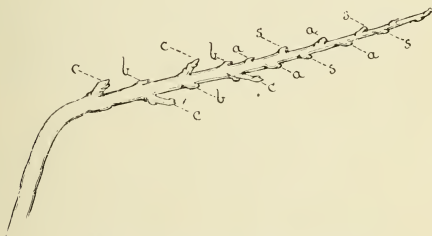


Fig. 13.—PRUNING TO FORM SPURS.

Explanation: See details in text.

ducing two shoots each, but the weakest one should be removed as soon as it can be seen which it is. The points of all the side growths or laterals should be taken out when they have made two leaves above the bunch, or at the sixth leaf from their base when no bunch is formed, but the top or leading shoot, which is to form the cane, should not be stopped until it has made seven feet of growth. Vines always have more shoots on them than can be left to grow, and some of these should be removed so that the retained growths are eighteen inches apart on each side of the rod. This will be better understood by referring to Fig. 13. The buds marked *a*, and the spurs marked *b*, are removed, leaving those marked *s* and *c* to form spurs. When thinned out, as here recommended, the shoots become strong, and will always produce

good bunches of grapes from the top to the bottom of the rod. Care must be taken not to tie the shoots down until they have become matured, or there will be a danger of their breaking off, causing a bare place which cannot afterwards be filled. All laterals produced from the side growths must have their points pinched out above the first leaf as soon as formed, and all further growths on these must also be removed. The laterals growing from the leading shoot should also be stopped above the first leaf, but other shoots may be permitted to grow from these until the end of August, when their points must be stopped. All tendrils, both on the shoots and bunches, should be removed as soon as they are formed. The strongest rods may be allowed to carry one bunch of grapes the second year, but this should never be left on the leading shoot, which is to form the rod.

**Temperature, Ventilation, etc.**—The night temperature should be increased to 60 deg. when the bunches are first seen, and to 65 deg. when they begin to flower, rising by sun heat in the day to 85 deg., and to 90 deg. during the flowering period. Damping down in the house should be discontinued in the mornings, and the evaporating trays should have no water put into them while the grapes are in flower; but the damping down should be continued at the time of closing in the afternoons. The ventilators should be opened, both front and the top, early in the morning when the grapes are in flower, to drive off the moisture in the atmosphere, so that the pollen may be dry as soon as possible. The vine-rods should have a gentle tap with a stick about two o'clock, to cause the pollen to fall on to the pistils and fertilise them.

**Watering the Borders.**—The borders inside must be watered as required. The necessity to apply water can best be determined by examination of the border. Sufficient water must always be given to thoroughly moisten the soil throughout at each watering. When the borders are made in sections, more water must be given than when the roots have

the whole border to root into. The outside borders will hardly ever require water until the middle of June. A mulching of manure should be put on immediately after watering to prevent evaporation. Water may be required again about the first week in July, the end of July, and the second week in August; but this will all depend upon the weather. The further treatment will be the same as that advised the previous year, and which will be more fully treated in the next chapter. If red spider appears, syringe forcibly the under sides of the leaves, taking care, however, not to cut the leaves to disfigure them. The vines should be pruned back the same distances as advised the previous year, and again washed with Gishurst Compound, and tied down to the front wires.

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## CHAPTER VIII.

### GENERAL MANAGEMENT.

THE treatment of the grape vine during the third and subsequent years is precisely the same, so now we will deal with the details of general management.

**When to Start Vines to Grow.**—We have previously advised the starting of the vines in February, in order to get the wood well ripened before winter, because young rods do not always ripen properly if allowed to start later in a natural way, without fire heat. At this stage they can be treated as established vines, and may be either forced earlier, so that the grapes may be ripe early in June, and the following years earlier still if required, or they may be brought on in a more natural way, so that the fruit may be ripe in winter or early spring, if required at that season. The vines should be started in November for ripening at the end of April, or early in May; or at the end of December to be ripe

early in June. The borders for the earliest grapes should be inside only. For grapes to be ripe early in June the borders may be both inside and outside, but the outside borders must be covered in November with a foot thickness of oak or beech leaves, a little long manure being placed over them, or thatched with straw, to prevent the leaves blowing away. For the earliest forcing a hotbed inside is a great assistance in warming the border, and in giving off moisture and ammonia.

**Temperature.**—A temperature of 50 deg., with a rise to 60 deg. by sun heat, should be maintained until the buds burst. This should be increased to 55 deg. at night, 60 deg. by day, with a rise to 70 deg. by sun heat. This, again, should be increased to 60 deg. at night, to 70 deg. by day, with a rise to 80 deg. by sun heat, as soon as the bunches are formed. When the grapes are in flower the temperature at night should be 65 deg., rising to 75 deg. by day and to 90 deg. by sun heat. When the grapes are set, the night temperature should be gradually lowered to 60 deg. at night, 70 deg. by day, and to 90 deg. by sun heat. When the stoning commences, which may be observed by the grapes not swelling, the day temperature by fire heat should not exceed 65 deg., rising to 85 deg. by sun heat. As soon as the berries show signs of swelling again after stoning, the heat should again be increased to 65 deg. by night, 75 deg. by day, rising to 90 deg. by sun heat. The night temperature should again be lowered to 60 deg. when the berries begin to colour. These temperatures are for normal weather, and are not to be kept rigidly when the weather is either very severe or when it is very mild for the season.

**Ventilation.**—The principal use of ventilation is to regulate the temperature, but fresh air is also necessary for the health of the vines. It is sometimes necessary also to raise the temperature in order to have a current of fresh air in the house. This is more especially the case when the vines are in flower, and when the grapes are colouring. Ventilation is also necessary to prevent scorching, scalding the

berries, and cracking. For preventing these evils it is very necessary to have a little ventilation on at the top just before the sun shines upon the house. During the frequent alternation of cloud and sunshine the fires should be kept on to permit a little ventilation, both at the top and front. It is the scalding-hot steam on the leaves or berries which is generally the cause of these evils. During the time cold, cutting winds are blowing, those ventilators should be opened widest through which the winds cannot so easily blow in. A very little ventilation on both top and front is better than having so much on at the top only, as is frequently done. An excess

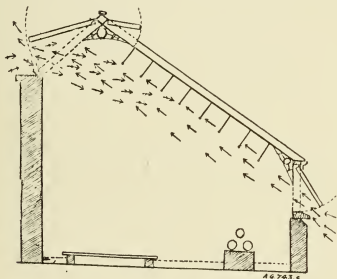


Fig. 14.—VENTILATING A VINERY.

Explanation: The direction of the arrows shows the air rushing in through the top north ventilator and meeting that from the bottom or south ones. The result is the meeting of the two currents of air impinges on the tender foliage and cripples it.

of top ventilation causes the warm, genial air to escape, when it is really required for the growth of the vines. The ventilators should never be thrown open wide at one time while the vine and grapes are growing, because this suddenly lowers the temperature and causes a check to the growth (see Fig. 14), causing many of the maladies which grapes suffer from. Very little ventilation is needed until growth commences, and not very much more until the grapes are in

flower, at which time a free ventilation is needed both at the top and front early in the day. Rather less air is needed when the berries are set, but it must be increased again while they are stoning. Less air is needed when the second swelling commences, until the berries begin to colour, when more is again required. Ventilation should be taken off as gradually as it is put on, so as to maintain a growing temperature throughout the day. All the air should be taken off at closing time, but a little put on again at the top before night. During the flowering and the stoning, and also when colouring, a little ventilation should be put on both front and top just before night. The ventilation should not be taken off so early in the day during the stoning as at any other time when growth is more active. Abundance of air must be given as soon as the grapes are ripe, and for the rest of the season, reducing it at sundown to keep out moisture, but leaving the ventilators open both front and top all night.

**Watering.**—No special dates can be given when watering can be done, because this depends so much upon the season and condition of the borders. Vines forced very early do not, as a rule, require so much water as those growing when more sun and air are present. The borders inside should always be kept in a moist condition throughout the growing season. This is best known by examining the soil from fourteen to eighteen inches below the surface when there is any doubt. A handful of the soil should be squeezed tightly, and if it holds together when it is dropped six inches it will be moist enough; if not, it must be watered. A good soaking should always be given. If the soil should have become very dry a second watering should be repeated three days after. About six gallons per square yard is a good ordinary watering. The inside borders should be thoroughly moist when the grapes are setting, and, generally, will require water about every three weeks until the grapes are ripe. Less water will be required after, but the border should never become quite dry. Outside borders are nearly always moist enough until June; in dry seasons they may require water about every

three weeks until the grapes are ripe, after which time no more should be given. Most water should be given close to the house, that being the hottest part. Where borders are made in sections the new parts should be watered more sparingly than the old. Warm water should always be used for the inside borders, and it is also best for the outside borders at the beginning of the season.

**Liquid Manure.**—Liquid manure should not be given until the new borders have become well filled with roots. It should then be given when the berries begin to set, and at every watering until the grapes are ripe. The liquid manure should be given immediately after every watering with clear water, giving at the rate of two gallons per square yard. The following liquid manure may be given: Best Peruvian guano, 1lb. to 15 gallons of water; 1 gallon of fowl manure to 18 gallons of water; 1 gallon of sheep or horse manure to 14 gallons of water; 1 gallon of soot to 18 gallons of water. The soot and the animal manures should be put into a bag, and the bag immersed in a tub a few days before using. Liquid manures may also be used from stables or cowsheds, always using it quite clear, and one part to two of water. The following chemical manure may also be used: Five parts superphosphate of lime, two parts sulphate of potash, and one and a half parts of sulphate of ammonia. Mix well together, and use two ounces per gallon of water. No liquid manure should be given to young vines in a new border for the first three years. The soil contains ample food to meet the requirements of the vines for at least three years; hence to apply liquid or other manures during that time is a waste of materials, besides being positively harmful to the vines.

**Atmospheric Moisture.**—The evaporating trays should always be kept filled, excepting when the grapes are in flower; and it should be discontinued as soon as they begin to colour; a continual moisture arises from these, which is never too much, excepting at the times above-mentioned. At other times the vines should be kept regularly syringed until three or four inches of growth have

been made, after which time they should not be syringed unless red spider attacks them, when syringing should be done with force, using soft water. The floors and walls should be syringed in the morning, at midday, at closing time, and after dark when forcing is being done. Less will be required on dull days, and when but little fire heat is used. The pipes should not be syringed when they are very hot, because the large volume of hot steam would injure the foliage and young berries.

**Mulching the Borders.**—The inside borders should



Fig. 15.—PRUNING AND DISBUDDING.

Explanation: A portion of a vine rod furnished with one spur (S, S) and growing lateral shoots. The short lines indicate where to shorten the spurs at the winter pruning. Read the text carefully.

have a mulching, about three inches thick, of fresh horse manure when the vines are started, if no hotbed be used. It is best to have the droppings thrown into a heap outside first, and when heating turn it inside out to sweeten it. Another mulching should be given after flowering, but if not sweetened it would cause the berries to rust. These mulchings keep the roots near the surface, and feed them, and the ammonia arising therefrom benefits the foliage, and helps to keep away red spider. Vine borders outside which have been mulched

during the winter should have the mulching taken off at the end of April to permit the sun and air to warm and sweeten the soil; but another mulching should be put on the first week in June to prevent the border getting too dry. Mulching keeps the borders moist by preventing evaporation in the summer, and where mulching is regularly done the roots are generally kept near the surface.

**Pruning.**—All the laterals on the main rod should be pruned back to two “eyes,” as shown in Fig. 13. When laterals form, if one of the two should be weaker than the other retain the stronger, or the one bearing the most promising bunch, and remove the other; finally cut back the old stump, as shown by the line C (Fig. 15), at the following winter’s pruning.

Sometimes the old spurs get very long and unsightly, but as long as they produce good bunches of grapes it is not wise to remove them. Occasionally these old spurs will push out a rather weakly growth from near the base, as shown at C, Fig. 15. This young shoot should be allowed to grow, and have full sunshine. The following winter cut the old spur (SS, Fig. 15) off, as shown by the cross mark above C, and a new spur will form from the weakly shoot. The buds shown at S on the old spur are some distance from the main rod. When these give birth to shoots the latter would overlap and crowd those on the next vine, and thus cause overcrowding of the foliage. If the spur, however, be shortened, a new shoot will develop in due course, take its place, and produce a better spur for the future. It is not often, however, that back buds will form to permit this being done. Another way is to allow a young shoot to grow from the bottom of the rod without pinching its point out until it has grown five feet; then stop the side laterals above the first leaf. The leaves from this rod must not be crowded by those from other shoots, and it will then form a nice young rod to take the place of the one from which it has grown, and the old one may be sawn away in the autumn. Pruning should always be done in a few

weeks after the leaves have fallen. See also Chapter IX., on Renovating Old Vines.

**Disbudding.**—Some of the weakest of the young shoots can be removed immediately after the buds have burst into growth in the spring, but the two shoots from the spur should be allowed to grow until the bunches can be seen, as explained

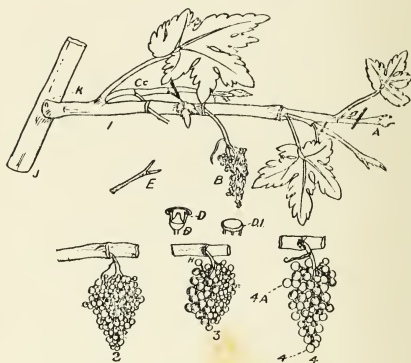


Fig 16.—STOPPING LATERAL SHOOTS.

Explanation: 1 is a lateral of young growth carrying an embryo bunch of grapes (B). C, is a sub-lateral which should have its point removed at short line. The point of shoot A should also be removed at the short line. E is a forked stick for holding the berries when thinning. D is the flower of a grape. 2, is an unthinned bunch of grapes; 3, an improperly thinned one; and 4, a properly thinned one.

in preceding paragraph; then the one should be left which promises to produce the best bunch of grapes. This precaution is necessary to ensure that only really strong laterals are retained, that will not only bear good bunches of fruit, but also form vigorous spurs for another season. The superfluous shoots are easily rubbed off with the finger and thumb. What

is wanted is a strong, healthy lateral at each spur, like that shown in Fig. 16.

**Stopping.**—All shoots should have their points pinched out when they have made two leaves above the first bunch (see A, Fig. 16). When there is no bunch it should be pinched above the sixth leaf. When the rods are rather close together leave one leaf only above the bunch, which is better than allowing them to become crowded. All the side growths, or sub-laterals (see C, Fig. 16) should be pinched back to one leaf, and all other growths be pulled off as soon as formed. The sub-laterals should also be removed entirely when the grapes begin to colour. Only one bunch should be left on a shoot, all the others being removed as soon as it can be seen which is the best one to leave. If the bunches are large ones, one to each shoot is too many, but these can be left until the time of thinning before they are removed. Tying the shoots down to the wires has to be carefully done, because they are so easily broken. If they do not break when they are tied they may do so afterwards if tied too soon. The shoots have become tougher by the time the grapes are in flower, and can be more safely tied to the wires then.

**Thinning.**—This is an operation which needs practice to become proficient. Before commencing thinning, remove all the surplus bunches. If too many bunches are left they will not come to perfection. Young vines especially are frequently ruined by over-cropping. A fair judgment can be made at the time of thinning as to what size each bunch will grow. A full-bearing rod in a healthy condition will be able to ripen one pound of grapes to every foot run of rod, and if the shoots are left eighteen inches apart on each side of the rod, that will be one shoot to every nine inches. If every shoot carries a bunch of grapes, the fruit should only average three-quarters of a pound to each shoot for a fair average crop. Young vines will frequently have bunches weighing from three to four pounds each, in which case their number must be reduced accordingly. The bunches are ready for

thinning from twelve to fifteen days after the berries are set, and it is much better to thin them at that stage, so that those which are left receive all the nutriment. It is also more expeditious to thin them before the berries become crowded together. The bunches should not be touched with the hands when thinning the berries. To avoid this, a thin forked stick (Fig. 16, E) about six inches long should be

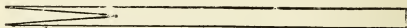


Fig. 17.—FORKED STICK FOR GRAPE THINNING.

used to hold the bunch, and turn it about while it is being thinned. A home-made one cut out of a piece of deal wood is better than a naturally-grown one (as illustrated by Fig. 17), because it holds the bunch firmer. A special pair of scissors, known as grape scissors, should be used for thinning (see Fig. 18). Thinning should be commenced at the bottom of the bunch, first taking out all the small berries. The berry at the extreme point should be left, and also those at the extreme points of the branchlets; but all others should be cut away that are within three-quarters of an inch of

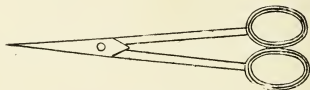


Fig. 18.—GRAPE SCISSORS.

it. The berries at the top part of the bunch should be left as thick again, because they have so much more room to swell. Those on the top branchlets should have very few berries taken out. The art of thinning is to leave the berries room enough to grow without being squeezed together tightly, yet thick enough to hold the bunch in its natural position when cut and laid down on the table. If the lower part

of the bunch be left thick the stalks of the berries are too short for the latter to push themselves out of the way, but towards the top of the bunch there is no difficulty on this point, as the branchlets are easily pushed upwards. The berries on the top part should be left as thick again as those on the bottom part, and they should be gradually left thicker from the bottom to the top. Fig. 19 shows a bunch properly thinned, and Fig. 20 one unthinned. When the top branch-



Fig. 19.—A PROPERLY THINNED BUNCH OF GRAPES.

Explanation; Note the berries are of even size and have plenty of room to develop.

lets, which are called shoulders, are large, it is better to tie them with pieces of raffia or wire, and sling them up to the rods or wires, in the manner illustrated on p. 55 (Fig. 21). Two shoulders are slung up in this way, but in large bunches four or more are slung up. Bunches which are to be kept late should be thinned more than those which are to be used as

soon as they are ripe. Large bunches do not keep so well as smaller ones, for which reason it is sometimes better to cut off the biggest shoulders instead of slinging them up.

**Keeping Grapes.**—It is of great importance to know how to keep grapes in good condition after they are ripe, and it is one which needs considerable care. So long as there be plenty of foliage to prevent the sun shining upon them they will only require abundance of ventilation in hot weather to keep the temperature down as low as possible, and a little



Fig. 20.—AN IMPROPERLY THINNED BUNCH OF GRAPES.

Explanation: Note the berries are irregular in size and too crowded to properly develop.

fire in wet or foggy weather to dispel the damp. It is an advantage to damp the house down on bright mornings, because this helps to prevent the berries shrivelling, but no more should be given than will dry up before closing time. White-washing, or shading the glass, helps to keep the sun's rays from them. We have sometimes used brown-paper collars over the bunches after the leaves have fallen. A close watch

must be made every day to see that no berries are decaying. One decayed berry will cause all the others to decay that touch it, and good plump bunches soon become disfigured and spoilt. The most difficult time is when the leaves are falling, and every decayed leaf should be removed at once. When the greater part of the bunches are cut, it is better to cut the



Fig. 21.—METHOD OF SUPPORTING A BUNCH.

Explanation: The illustration shows the method of supporting the "shoulders" of a large bunch of Black Alicante grapes to ensure their perfect ripening. (Photo: H. A. Smith.)

remainder, and take them into a cool, dark room, where a fire or lamp may be used occasionally to dispel the damp. The bunches should be cut with as great a length of young wood as can be spared, which should be put into bottles of water

(see Figs. 22 and 23). Ordinary wine bottles are the most suitable for the purpose, and these should be nearly filled with clean, soft water, putting in also four or five pieces of charcoal. The bottles should first be fixed on racks against

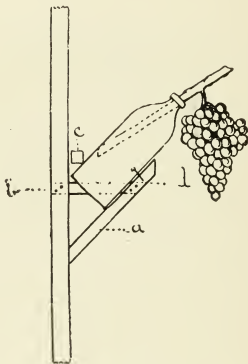


Fig. 22.—METHOD OF PRESERVING GRAPES.

Explanation: This is a very simple plan and easily constructed.

a wall to prevent them falling over when the bunches are put into them. Fig. 22 (*a*) shows a shelf or board nailed to an upright at the bottom, and fastened at top to the upright by a piece of wood, as shown at *b*. The end of a piece of wood is shown at *c*, which prevents the bottles from tumbling over when the grapes are put in. Nails are put in the board each side of the bottles to prevent them rolling about out of their place, as shown at *d*. The bottles must not be filled too full, or the water will run out on to the bunch when the stalk or shoot is put into the bottle. The room should be clean, and contain no decayed rubbish of any kind. We have found that about one gallon of fresh lime put down in a box

in one corner will absorb any moisture in the room. An old bag should be thrown over it to prevent any dust arising therefrom when the door is opened. This often answers bet-

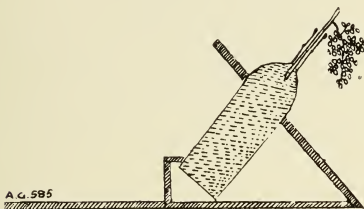


Fig. 23.—ANOTHER METHOD.

Explanation: This is a more elaborate rack, boards being fixed as shown in section, and holes cut in front board to admit the bottles.

ter than a fire or lamp, because it is cooler, and the bunches will keep in good condition if there are no affected berries when they are brought in. They keep their dark colour better in a dark than in a light room, or in a vinery.



## CHAPTER IX.

**RENOVATING OLD VINES.**

VINES are frequently found in bad condition from some cause, such as overcropping, bad attacks of insect pests, or mildew; or the roots may have got into some bad material in the sub-soil, or have strayed out of the border into an unsuitable soil.

**A Successful Example of Renovation.**—It is very rarely that vines are too old to bear good crops. We have had the management of vines that were over one hundred years old, and which we brought into good bearing condition. The vine border in this case had been dug with a spade every year, and flowers of every description had been regularly grown upon it. We set to work to renovate the border in the following manner: A trench was dug 14ft. from the front of the house, and large roots were found without any fibres about 3ft. deep, which were cut asunder. The top soil of the border was then taken off down to the roots, and roots, large and small, were turned round towards the house. Notches were then cut in the large roots from nine to twelve inches apart along the whole length. Good turfy loam was chopped up, to which was added one-sixth of fresh, sweetened horse droppings. Half-a-pound of best fine bonemeal was added to each barrowload of soil, and a quarter of a pound of soot. These were all mixed together and placed under the roots, so as to bring them up to within nine inches of the surface. The roots and soil surrounding them was watered with warm water through a rose, and the roots covered with the same compost as that put underneath them, and this trod rather firmly. A mulching of rather long fresh manure, about nine inches thick, was put on the surface. This was done at

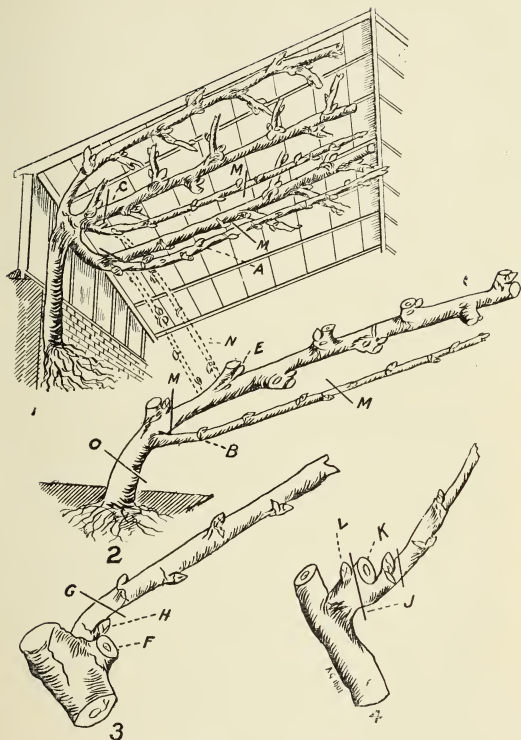


Fig. 24.—RENOVATING OLD VINES.

Explanation: 1, Shows an old vine with its roots freed from sour soil, fresh compost being put in its place. To rejuvenate the old vine young rods (A) are allowed to grow from the back of the old rod, M (Fig. 1). In due time the young rod (B, Fig. 2) is shortened to 3ft. at M, and then the old rod, E, is cut back at M. Where young rods will not grow strongly, cut the main rod back to O, Fig. 2, to force new and vigorous growth. Fig 3, F, shows an old spur cut away; G, where the lateral should be pruned to form a new spur with an eye, H. Fig. 4, shows the wrong way to prune, shortening the old spur (K) to L, instead of cutting back to J.

the end of September, as soon as the grapes were cut, when a few of the leaves were beginning to turn a little yellow. The house was kept nearly closed and shaded, and the vines kept moist by syringing. The old vines had from two to four rods on each, the spurs on all of which were long and ugly; so every other one of these rods was cut down to the lowest wire soon after the leaves had all fallen, and young rods trained up in their stead the following season. This was a complete success, for the old rods had nearly as good a crop the next year as in the previous year, and fine new rods were formed from those rods that were cut down, which bore fine grapes in a few years, at which time the other old rods were also cut down. The border was kept regularly mulched, and no flowers were allowed to grow thereon. This example may be followed by those who may have vines in an unsatisfactory state. See Fig. 24.

**Encouraging New Growth in Old Vines.**—Old vines which have been weakened by overcropping, insect pests, or mildew may be rejuvenated by cutting down the old rods and training up new ones. The young rods must be treated the same as young vines newly planted. The great mistake usually made is in not cutting the young rods back enough, and also in allowing them to be overcropped. Heavy dressings of chemical or other manures are no good if the roots are not there to receive them, but if the roots are brought near the surface manures are very beneficial to old vines.



## CHAPTER X.

**VINES IN A GREENHOUSE.**

Good crops of grapes are annually cultivated in houses in which a mixture of ordinary greenhouse plants are grown. Vines, to succeed in such houses, must be fully exposed to sunlight the whole, or nearly the whole, of the day. The plants or creepers must not be allowed to grow up among the vines to obstruct the light, or crowd them. The vine rods should be trained up from five to six feet apart, so that plenty of light and air can be given to both vines and plants; or with a single main stem furnished with branch-rods, as shown in Fig. 25. The borders for the vines should be entirely outside, to prevent them becoming too wet and sour by the continual watering of the plants, and the constant treading of the border while in a wet condition.

**Growing Plants with Vines.**—Plants should not be grown with grape vines that are likely to harbour mealy bug, thrips, or red spider. On the first appearance of any such pests the plants should be taken outside, laid on their sides, and forcibly syringed with some insecticide which will destroy the pests. In the case of mealy bug, it is best to sacrifice an infested plant than to run the risk of affecting the whole house. The houses should have the same temperature, ventilation, and moisture as advised in the chapters under those headings, and grow only those plants to which those conditions will be suitable; and also grow those which are not so subject to injurious pests. Ferns, palms, aralias, spiræas, bulbs, camellias, cyclamens, chrysanthemums, primulas, fuchsias, cinerarias, and zonal pelargoniums, may be successfully grown under vines without injury.

**Vines in Unheated Houses.**—These may be grown successfully in lean-to houses, facing south or a little towards the south-west, in most parts of the country; also in span-roofed houses running from south to north, with their sides facing east and west. The vines are best planted in outside borders, with their stems coming through holes in the brick-

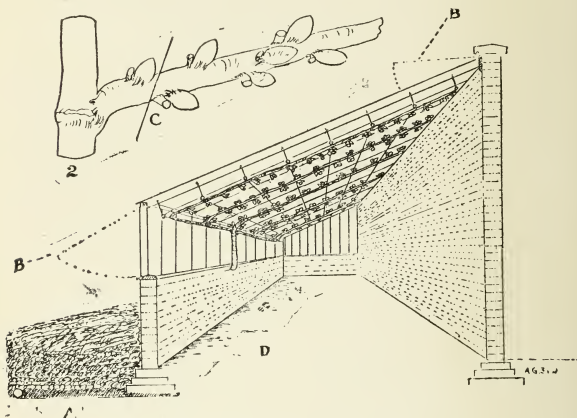


Fig. 25.—A SINGLE VINE WITH SEVERAL RODS.

Explanation: This plan of training is suitable for a small house. Two rods are first trained horizontally, then vertical rods taken up from these at 3ft. apart. B, shows the width to open ventilators; and C, where to prune in winter.

work close to the ground, as shown on p. 16, so that their stems are not exposed to the outside weather. A clay or wet subsoil is most unsuitable, because the vines will not ripen their wood sufficiently. In such soils the borders should be made and raised as advised at p. 25. A light or gravelly soil is the most suitable for cold vineries. The vines in

these houses should be trained twenty inches from the glass to prevent the young shoots being frozen by late spring or early autumn frosts. The young shoots are more brittle in these houses than where fire heat is used, and cannot be tied down so early. If thick roller blinds could be let down on frosty nights in spring and autumn, unheated houses would be more successful. The houses should be kept closed in severe weather in winter, but at other times ventilation must be given to prevent the buds growing too soon. The end of March is soon enough for the buds to start, and free ventilation will prevent them starting too early. Less ventilation must be given when the danger of injury



Fig. 26.—DIAGRAM OF OUTDOOR VINE BORDER.

from early frosts is over. The houses should be closed early in May and onwards, when the temperature may run up to 90 deg. by sun heat, but a little ventilation should be put on again both back and front at nightfall. Damp the walls and floors when closing early on bright days, but no damping down is needed at any other time. The ventilation should be increased just before the sun shines upon the houses, and the rods should have a tap to shake the wet off, which generally is thick upon the leaves in the growing season. The instructions given for disbudding, pinching, tying, thinning, etc., elsewhere apply here also. The grapes which are not used at the fall of the leaf should be cut and taken into a dark room, as previously advised.

## CHAPTER XI.

## OUT-DOOR VINES.

THESE can be grown in the South of England, and on the east and west coasts, and counties of the same, but are more uncertain in the Midlands and the North. A south wall and one inclining to the south-west are the best positions.

**Soil and Planting.**—They will thrive in good ordinary garden soils, if not too wet and heavy. Those of a gravelly nature, and containing a fair amount of lime, are best. Where

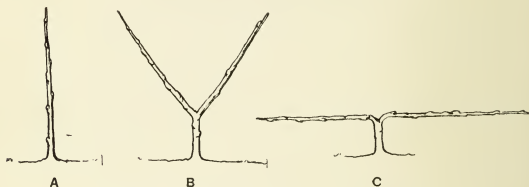


Fig. 27.—DIAGRAMS OF VINE TRAINING.

Explanation: A, shows a vine one year old. B, shows the same vine shortened in winter to 1 foot, and two shoots trained up the next season. C, shows the two shoots bent down horizontally in winter and young shoots taken like those in Fig. 28 to form a properly trained vine.

the soil, however, is not satisfactory, it is better to make a special border three feet deep, as shown in diagram, Fig. 26. If lime be deficient, use half a pound of basic slag per square yard, and thoroughly mix with the top foot of soil, which should be done some time previous to planting. If the plants have been grown in pots the roots should be thoroughly disentangled and spread out

six inches below the surface, and covered with turfy loam in which some fresh, sweetened horse droppings have been mixed. The plants should be cut down some time in winter to within three good "eyes" from the bottom, and planting be done the end of February.

**First Year's Training.**—The two best shoots should be allowed to grow without stopping, and be kept nailed to

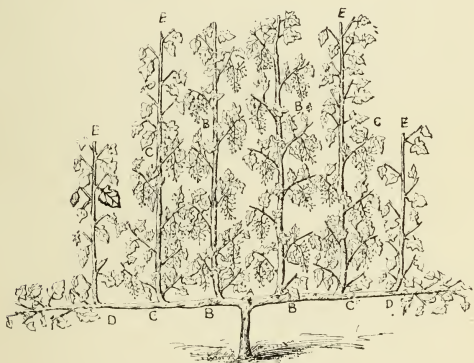


Fig. 28.—PROPERLY TRAINED OUTDOOR VINE.

Explanation: The main rods are furnished with laterals which require to be stopped in summer and pruned in winter to form spurs as described for indoor vines.

the wall as they grow, pinching all side growths as soon as they have formed one leaf. Any other shoots which grow beside the two selected ones should have their points taken out when they have grown about a foot, and all other shoots be pinched off as they are formed. If the soil be moist at the time of planting, no water will be needed until about the middle of May, when a good watering should be given. Apply

a mulching of manure four inches thick at the same time. If the weather be hot and dry, repeat the waterings every four weeks until the end of August, after which time no more water should be given.

**A Remedy for Mildew.**—If there were any signs of mildew during the summer the vines should be washed with Gishurst Compound, using at the rate of six ounces to each



Fig. 29.—MODE OF STOPPING LATERAL SHOOTS.

gallon of water, and the walls should be washed with hot lime. If the white colour be objectionable, boil one pound of lime with one pound of sulphur in a gallon of water for twenty minutes, stirring occasionally. The sulphur should be first made into a paste before boiling, because it dissolves quicker thus. When dissolved, pour off the clear liquid and add to it five gallons of water. If the wall be thoroughly washed with this clear liquid it will destroy all the mildew spores it touches.

**Pruning.**—During the first winter after planting, the young vine (A, Fig. 27) should be pruned back to within three feet of the bottom, and the following summer two young shoots (B, Fig. 27), one on each side, should be trained down in a horizontal position (C, Fig. 27). The next winter the ends of these two shoots should be cut off, leaving the rods as shown in Fig. 27. The next summer allow young shoots to grow up, at three feet apart, to form rods and spurs, and lay the foundation for covering the wall, fence, or building (see Fig. 28). Spurs should only be left from twelve to fourteen inches apart on each side of the new rods, and if there are more growths made than are required for future spurs they should be broken off as soon as they begin to grow. The shoots left for spurs are best on the sides of the rods. The second season two other rods should be trained up besides those of the first year, and these should be treated the same as advised for the others, and new rods trained up each year until the whole of the space is filled. The rods should not be nearer than three feet from one another. In pruning to form spurs in winter, the side growths should be cut back to the lowest plump bud close to the rod. Every shoot should be stopped one leaf beyond the first bunch, only allowing one shoot to grow from each spur, and permitting only one bunch to remain on each shoot (see short lines at end of shoot, Fig. 29). Weak liquid manure should be given the end of June in each year, giving enough to thoroughly moisten the border.



## CHAPTER XII.

**VARIETIES.****FOR OUTSIDE BUILDINGS OR WALLS.**

**ROYAL MUSCADINE.**—Fruit white. This is the variety most generally grown against cottages. It is hardy and an abundant bearer. It has a good flavour, and ripens well in good situations when properly grown.

**CHASSELAS VIBERT.**—Fruit white. This has large bunches, rich in flavour, golden amber in colour; hardy, and a good bearer, sometimes ripening before Royal Muscadine.

**EARLY BLACK JULY.**—Bunches fairly long; berries round, rather small, deep purplish-black, sweet, and pleasant flavour. This is the best black variety for a wall or building.

**FOR UNHEATED HOUSES.**

**BLACK HAMBURGH.**—Fruit black. Large in bunch and berry; rich flavour, and a good constitution. This variety is more easily grown than any other black grape, succeeding in all positions where grapes can be grown.

**FOSTER'S SEEDLING.**—Fruit white. Bunches large; berries medium size; very good flavour. This variety has a good constitution, and is a very free bearer, making a splendid white companion to Black Hamburgh.

Other sorts described below may also be grown, as Early Black July and Black Prince.

## FOR A HEATED GREENHOUSE.

Black Hambro', Foster's Seedling, and Madresfield Court. The last-named variety has long, compact bunches, with large oval berries having a rich Muscat flavour. Although this

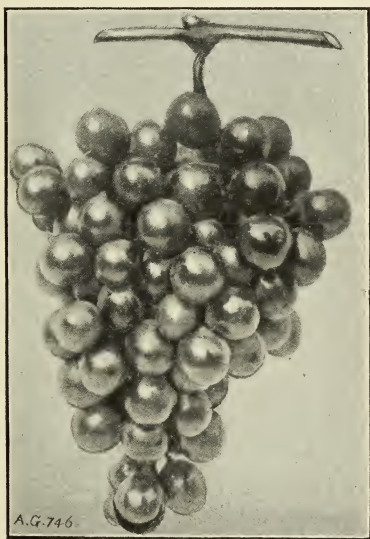


Fig. 50.—THE BLACK HAMBRO' GRAPE.

A small bunch of this excellent early grape, as grown in a small greenhouse.  
(Photo: H. A. Smith.)

variety is liable to crack in some situations, it has a good constitution, is a free bearer, and sets freely; will keep until December.

## FOR A MIXED VINERY.

FOR EARLY FORCING.—Black Hamburgh, Foster's Seedling, and Madresfield Court.

FOR LATE KEEPING.—Gros Colmar, Lady Downes, and Muscat of Alexandria.

GROS COLMAR.—Fruit black. This variety has large bunches, with very large, round berries, having thick, tough skins, which enables the fruit to keep for a long time. It is juicy, but very poor flavour, unless ripened early. This is a noble-looking grape, and is very largely grown for market.

LADY DOWNES.—Fruit black. This has long, compact bunches, with large roundish-oval berries, having a rich and slight Muscat flavour. It has a thick, tough skin, which enables the fruit to keep for a very long time after it is ripe. See Fig. 12, p. 38.

MUSCAT OF ALEXANDRIA.—Fruit white. This has very long bunches, with large oval berries of a clear, golden-amber colour when ripe. Flesh firm, with an exceedingly rich Muscat flavour. Although it has a thin skin, it keeps for a long time after it is ripe. It has a good constitution, is a free bearer, but requires a high temperature to set and ripen thoroughly. Plant at warmest end of house. See Fig. 31.

BLACK PRINCE.—Long tapering bunches; berries medium size, oval, deep purplish-black; sweet, brisk flavour. A good grower, hardy, and suitable for a wall in the warmest districts. Very good variety for a cool house, and is a favourite with some growers for a mixed house.

DR. HOGG.—Long tapering bunches, with good shoulders; berries large, roundish; a rich golden-amber when ripe, and of delicious flavour. A fine grape for a mixed house, coming in about mid-season.

LADY HASTINGS.—Bunches long and well shouldered; berries roundish-oval and black; flesh firm; brisk, Muscat flavour. A rather delicate grower, but a very fine grape in a mixed house, and keeps up to the middle of December.

MRS. PINCE.—Long, tapering, well-shouldered bunches of the largest size; berries above medium size, black; a firm, rich Muscat flavour. A good constitution, but should not be pruned too closely, because it does not always produce bunches

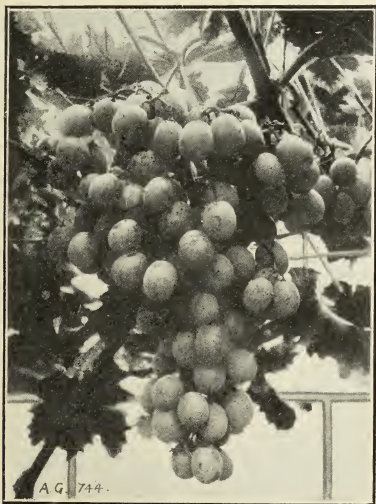


Fig. 31.—“QUEEN OF GRAPES”: MUSCAT OF ALEXANDRIA.

One of the most luscious grapes when well grown and properly ripened.  
(Photo: H. A. Smith.)

on the back buds. A good grape for a mixed house, to be grown next to the Muscat.

GROS MAROC.—Bunches rather short, with broad shoulders; berries very large, roundish-oval, and black; flesh firm, but not the rich flavour of many others, partaking more of the

character of Gros Colmar. This is one of the best varieties for exhibition on account of its noble appearance.

**GROS GUILLAUME.**—Bunches exceptionally large, often weighing more than ten pounds; very broad shoulders, several of which require tying up. Berries large, roundish-oval in shape, and black. In spite of its large bunches they colour well, the berries having a dense bloom upon them. The flesh is tender, juicy, and of fairly rich flavour. Suitable for the warmest end of a mixed house of grapes, but should be ripe early. It will then keep up to the end of March. It requires more room than many others to grow, because the spurs have to be left longer at the time of pruning to produce the best bunches.

**LADY HUTT.**—Long, large bunches, with large roundish berries of a deep amber colour when ripe. It has a brisk flavour, something between Foster's Seedling and a Muscat. Suitable for a mixed house, but requires a rather high temperature. It is a good late-keeping grape.

**BLACK ALICANTE.**—Bunches fairly long, large, well-shouldered; berries large oval; skin thick and tough, jet black, with a fine bloom; flavour juicy, brisk, and fair. This is a very showy variety, of a good constitution, and a free bearer. An easy grape to grow in a fairly cool temperature, and keeps well up to March. If this grape had a thinner skin, and a little better flavour it would be one of the most popular varieties.

**APPLEY TOWERS.**—This is considered by many to be a seedling from the above variety. It resembles it in the shape of its bunches, and also its berries, but is of decidedly better flavour. It is a good grower, has a good constitution, and should certainly be included in a collection of mixed varieties. It keeps well up to January.

## CHAPTER XIII.

## VINES IN POTS.

THIS method of growing vines was very fashionable a few years ago. It has many advantages to recommend it, and in some cases it is a necessity to grow them in pots. It has been much practised for early forcing, because the very early forcing of established vines planted out in a border soon wears them out. One great difficulty with old vines very early forced is to prevent them starting into growth again the same season. That is to say, the back buds, which should remain dormant until the following winter, will sometimes start into growth in summer, which is too early for them to perfect a crop in mid-winter, and the consequence is that the vines have to be destroyed, and others planted in their place. Whereas vines which are grown in pots can be thrown away as soon as they have done fruiting, and others grown on to take their place without injuring the permanent vines.

**Early Forcing of Pot Vines.**—We have regularly ripened grapes in March from vines in pots, which have been struck from “eyes” the previous January. It requires a great amount of heat to do this, and may be more easily done by growing the vines from “eyes” which were struck two years previously. We had to grow the plants in a very high temperature, trained over the walk in a pine stove, and also fruit them in the same position. Vines may be grown in pots, and good crops produced from them in a greenhouse where the soil is unsuitable for vines planted out, or where there is no convenience for making a vine border. There are many amateurs’ greenhouses and conservatories where vines may be successfully grown in pots. They are frequently grown thus

where a new vinery has been made, and planted with young vines. Many young vines planted out for a permanent vinery have been ruined by permitting them to bear fruit too soon. Pot vines may be bought from nurserymen which will produce good crops of grapes the following spring. These should be obtained in November, and at once pruned back if any pruning be necessary. The young rods may be left from six to seven feet long. If any pruning be required it is best to leave them outdoors in a sheltered position for two or three weeks after the pruning, to prevent them bleeding. If the vines are required to ripen their fruit in March, or early in April, they should be obtained in October, pruned at once and afterwards stood outdoors in the coldest place to be found. An exposure to an early frost before being taken in for forcing is very beneficial to the vines, causing them to start into growth more freely. Place them in a house early in November in a night temperature of 50 deg. If the pots can be partly plunged in a gentle hotbed inside the house they will start much better. If not, they must be stood on a slate over the hot-water pipes. They must have bottom heat to start them at that early season if they are to succeed. The house must be kept saturated with moisture, and the vine-rods themselves must also be syringed several times a day if necessary to prevent them becoming dry. No ventilation will be required before growth commences; it is best to use as little fire heat as possible. We forgot to say that the vines should be tied down so that their points at top are level with the top of the pot; if this be not done the upper buds only will break, the lower ones remaining dormant, or only breaking very weakly.

**Pot Vines Planted Out.**—Melons and cucumbers are often grown in beds or borders with pipes underneath for bottom heat. Houses of this type are very suitable for the early forcing of pot vines. We have used these places filled with manure and leaves, also with tan, to plunge the pots in for bottom heat. The plunging material evolves warmth and moisture at first, while the bottom pipes will continue to

afford heat after that of the bed is exhausted. Manure and leaves are best, however, because the roots are permitted to root out into it when the vines are in full growth. We have also been very successful in planting the vines out in these beds, in which case they cease to be pot vines, but give less trouble in watering and feeding when treated thus. Fresh turfy loam chopped up to about three inches square, a little fresh, well-sweetened horse droppings, using about one-sixth, also one pound of bonemeal and three pounds of wood-ashes to each barrowful of turf, should be used as a compost for the vines. These ingredients are well mixed together, and then trodden firmly one foot in depth. The vines root quickly in this, and ripen heavy crops of grapes, which can be had ripe at the end of March. In all these cases the temperature and other conditions must be the same as for the vines in pots.

### **Management of Fruiting Vines in Pots.—**

When the vines commence to break, the temperature must be gradually raised to 55 deg., with rather less moisture. As soon as the young shoots have grown about six inches long the young rods must be tied up to the wires in their natural position. The temperature must be gradually increased to 60 deg. by night and 65 deg. by day by the time the bunches begin to show. If the pots are not permitted to root out into any manure or soil they should now receive a little manure water, soot water, or Peruvian guano being the best to begin with. This must be given weak at first, at every other watering. The points of each shoot should be pinched out above the second leaf beyond the bunch. Only one bunch must be left on one shoot, and only six bunches should be allowed to grow on each rod. Those planted out, or those rooting into rich soil or manure, may bear eight bunches. If more bunches than these are allowed they will rarely finish ripening satisfactorily. Keep a drier atmosphere when the bunches come into flower, increasing the night temperature to 65 deg. and the day temperature to 75 deg. by fire heat, or to 90 deg. by sun heat. Very little air will be necessary up to the flowering stage, but there must now be a circulation

at the front and the top ventilators, however small they may be. It is best to give assistance by distributing the pollen on to the pistils. A hare's tail, or a good handful of soft feathers tied on a stick, should be gently drawn up and down the bunches a few times while they are in flower. More moisture must be given as soon as the berries have set, always using clean, soft water if the vines are syringed. Syringing may be done twice a day, and the walls and floors should always be kept moist, throwing water down about nine o'clock at night. Weak liquid manure should now be given at every watering, using a different kind as often as possible. No fresh leaves should be allowed to grow after the first stopping. Thinning should be done as soon as possible after the berries have set, which will be in about ten or twelve days. See earlier remarks on thinning. Give less manure water during the stoning, but one or two applications of lime water instead, putting one gallon of lime in twenty gallons of water, and allowing it to become clear before using. Give rather more ventilation also at the time of stoning. Increase the heat when the second swelling begins, giving more again when colouring commences, at which time liquid manure should be discontinued. It requires great care to force vines to have their fruit ripe the end of March or in April. They are more easily grown when they are not wanted ripe so early. When not required until the end of June and up to the end of September, the treatment will be the same as for established vines, excepting that more water will be needed.

**Rearing Pot Vines.**—We suggested that pot vines should be bought for early forcing, but those who have convenience may grow their own plants. They may be struck from "eyes," as advised in the chapter on Propagating, putting them in in February or early in March, and growing them on as recommended. Those that have grown strong enough by the end of August should be taken outside and nailed against a south wall. Water must be given them, but they should not be kept too wet. If the pots are shaded by boards or bags they will be prevented drying so rapidly.

This position will more thoroughly ripen the wood than if the vines are kept inside. So soon as the leaves have fallen the rods should be pruned if they need pruning, and the vines may be taken inside at the time required for forcing or for growing later. In most cases it is better to cut them down in November, and grow them on again the second year, when much finer canes may be grown than in one year. All the weaker canes should be cut down to within six inches of the pot, and the soil be allowed to become quite dry. They should then either be top-dressed or repotted. We prefer to shake all the soil out from among the roots, and repot them into fresh turfy soil, the same as previously recommended, putting them into ten or twelve-inch pots, and ramming the soil quite firmly. They should not be allowed to become quite so dry if they are only top-dressed, or there will be a great difficulty in getting the soil moist again in the middle of the ball. As much soil should be taken off as the roots will permit, and this be replaced by the same turfy mixture. These should be put into a similar temperature and treated the same as that recommended for starting pot vines. If a convenient place can be found for them, the end of February or early in March is a good time to start them, and they will make good canes by the end of the season for fruiting the following year.

**Vines in Small Pots for Dinner Table.**—Vines bearing three to five bunches may be grown in small pots, and, when ripe, may be taken into the house and put in a vase on the table, where the fruit may be cut as required. When the vine has been grown in a ten or twelve-inch pot during the summer, after the autumn pruning has been done and the plant rested, it should be placed in heat in the ordinary way. The rod should then be drawn through a seven-inch pot, as shown in Fig. 32. The hole at the bottom should be made larger for the cane to be drawn through. The young shoot should be stopped when it has grown four feet the previous year, instead of seven feet, but the next shoot on the top must be permitted to grow on to seven

feet before it is stopped again. At the autumn pruning, the young cane, or rod, must be cut down just below where it was stopped at four feet high. As soon as the young rod has been drawn through the pot, the small pot must be filled with the same kind of turfy soil as before recommended, keeping the rod in the middle of the pot. The part of rod in the small pot will make roots into the soil, and the plant will be all the better for having the extra soil to feed upon while growing. When the grapes are ripe, the rod must



Fig. 32.—DWARF VINE FOR DINNER TABLE.

Explanation: This shows a young vine rod passed through a small pot on the top of a larger one, in which the former is growing. In due course the stem roots into the smaller pot, and then is severed just below and used as a dwarf vine laden with fruit.

be cut off between the two pots, and the plant in the small pot may then be taken into the house for the dinner table.

#### **Another Method of Growing Small Vines.—**

There is another way of growing these small pot plants for the dinner table, which may be carried out with less trouble than the preceding one, because it is not necessary to grow the vines in pots beforehand. This is done by allowing a strong shoot to grow on the established vines some four feet the year previous to when it is required to be rooted. It is

then stopped, and the laterals are also stopped in the ordinary way, not permitting any further growth beyond the four feet. Notches, like those shown at *a*, Fig. 33, have to be cut in the rod as soon as the leaves have fallen in the autumn. If done later it causes bleeding. These notches are cut to assist root action, but they are not necessary, for we find the pot always becomes filled with roots without them. This shoot has then to be drawn through the bottom of a six or a seven-inch pot, as shown in Fig. 33, and filled up with good turfy soil, the same as recommended previously, keeping the rod in the centre of the pot. After the rod has been drawn through and the pot filled with turfy soil, the pot must be fixed to the wires, or placed on a shelf if there be one close enough, or any other arrangement to support it. The soil in the pot must be kept regularly watered during the summer, and the rod cut off close below the pot when the grapes are ripe. Fig. 34 shows the plant in full growth, with two bunches of grapes on, but four or five may be grown on each one in this way, because the old vines give the young vine its principal support until it is cut off. The grapes will keep for a week or two after the rod is cut off, if required.



## CHAPTER XIV.

**BLEEDING OF VINES.**

WHEN a vine is pruned at a certain period the sap often oozes freely from the wounds, and weakens the future growth. This unfortunate occurrence is termed "bleeding" by gardeners. As the subject is one of great importance to all concerned in the cultivation of the vine, we shall devote a special chapter to it.

**Cause of Bleeding.**—The grape vine, like all vegetation, is built up of an aggregated number of cells which contain crude and elaborated plant food called sap. After the leaves of a vine have fallen, the sap, which during the season of growth has been more or less liquified, becomes intensified, and almost solid. Growth is then at rest, and the sap quiescent. If we cut a shoot of a vine in winter, when the sap is dormant, the surface of the wound remains dry; there is little if any moisture to be seen. If we prune in January, or say February, there will be distinct evidence of moisture on the wound, and this may increase in volume until it runs freely from the cut surface. Thus the wound is said to "bleed," and in bad cases a vine may lose as much as a quart of sap per day. This "bleeding" is due either to imperfectly ripened wood or to the liquefying of the sap by the action of heat. In the former case the sap, instead of resolving itself by the ripening process in autumn into starch, has partly remained in the form of sugar in the cells, and in this liquid state is easily forced by root pressure through the cut cells of the newly-made wound. In the other case the increased warmth of the approaching spring, or of artificial heat, has had a solvent effect upon the starch in the cells, and caused the

chemical transformation of this into sugar, the liquid form of sap. Directly this change takes place the cells of the stems, buds, and roots become turgid and swollen with the increasing volume of liquid, and the roots at the same time begin to absorb more food, so that there is strong pressure from the roots upwards in readiness to force the dormant buds into new growth. When a wound is made at this stage of the activity of the vine the cut cells discharge their sap, and there

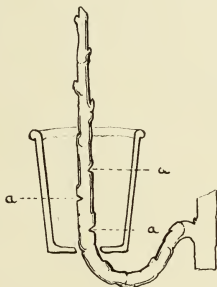


Fig. 33.—METHOD OF SECURING DWARF VINES.

Explanation: A lateral of a vine is passed through a small pot, notches are made as shown in the lateral at a, a, a, and the pot filled with compost. See p. 78.

is a rush upwards from cell to cell of fresh supplies, these in turn forcing their way through the wounds. The vine is unusually rich in sap, and consequently the flow is great when once growth commences.

**Remedies.**—The best of all remedies is a preventive one. That is, to take care to prune whilst the sap is dormant, in December. There is then little risk of bleeding, as the sap is not active enough to force its way through the wounds before the latter becomes dry and hard on the surface. If "bleeding" should occur, and only of a slight character, char the wounded surface with a red-hot iron. This will close the

cells. Another simple remedy is to cut a potato tuber in halves, make a hole in the centre, and fix this tightly on the wound. Yet another plan is to first dry the wound with a hot iron, and then apply melted sealing-wax over the wound. In bad cases tie a piece of stout bladder-skin over the latter. We have seen instances where even this remedy has failed.



Fig. 34.—DWARF VINE IN FRUIT.

Explanation: This is the result of treating a lateral shoot as illustrated by Fig. 33.

The flow of sap, accelerated by the root pressure, has been so great that it has expanded the bladder to such an extent as to burst it. In this case there is no hope of stopping the "bleeding." Most gardeners who have any doubt as to their vines being immune from "bleeding" take the precaution to paint the wounds with a solution of spirits of wine and shellac.

This forms a kind of gum, which hardens on exposure to the air, and generally proves effective in preventing the loss of sap. In the event of vines bleeding, the process generally goes on, unless checked, until leaves form and can utilise the sap. Those that bleed freely are, however, seriously crippled by the loss of sap, and afterwards make very weakly growth; in fact, are often utterly ruined in consequence. It should be remembered that the sap which oozes away through the wounds is the reserve food stored up for feeding the developing buds and shoots, and if there be a shortage of this the latter have nothing to support them.

## CHAPTER XV.

### THE “DOUBTS AND DIFFICULTIES” OF GRAPE CULTURE.

AMONG the many who will become purchasers and readers of this Handbook will doubtless be some who have had no previous experience in the cultivation of the grape vine, and who consequently need a few special hints to guard them against committing errors in their initial attempts to practise the art. Many and many a crop of grapes, and many a vine, have been spoiled through lack of knowledge of a few simple facts which are not as a rule embodied in books on vine culture. Most authors assume that the reader possesses at least an elementary knowledge of gardening, and so abstain from giving what they consider unnecessary details. Well, we are going to depart from that rule, and devote a chapter to a few commonplace observations for the benefit of the novice in gardening matters.

**Burying Dead Animals in Vine Borders.**—There is a notion, handed down from traditional sources of ques-

tionable repute among inexperienced amateur gardeners, that the vine will neither thrive nor be fruitful unless the dead carcase of a cow, cat, horse, or other animal be buried in the border for the roots to feast upon. Never was a more stupid notion entertained. Instead of the decomposing flesh being of the slightest benefit to the vine, it will poison the soil, kill the roots, and do serious injury to the whole of the vine. We know of instances where dead animals have been placed in the bottom of newly-made vine borders, with disastrous results to the vines. Vines do not need such rank garbage to feed upon; nor do they require to have fresh blood dug into the borders, or placed upon them at any time. The only materials that should be used in the formation of a new border, or in the renovation or feeding of an old one, are those advised earlier in this work.

**Burning Sulphur in a Vinery.**—Another fatal error committed through ignorance is that of taking hot coals into a vinery and placing brimstone or sulphur upon them, with a view to give off fumes to kill insects and the mite called the red spider. This mistake is often made and admitted by readers of "Amateur Gardening," hence this warning. The fumes emitted from burning sulphur will undoubtedly kill pests, and also the vines. Sulphur fumes are deadly to animal, human, and vegetable life, and therefore sulphur should never be burnt in a vinery or plant house, but used as recommended elsewhere.

**Defoliating Vines.**—Beginners, and many so-called gardeners also, make serious mistakes in disbudding and stopping their vines. They wait till the shoots are a foot or so long, then all at once remove those not required. Again, when the shoots get well advanced in growth, and sub-laterals have formed and crowded the roof with foliage, the whole of the superfluous growth is removed at once. It is a grave mistake to do either of the foregoing operations at one time. The result of doing so is a serious check to the growth of the vine. The cells of the stem and roots become suddenly

overcharged with sap, for which there is no adequate outlet, and this is forced into the cells of the remaining foliage, causing them to become turgid, bulge out, and burst, and form warty excrescences on the surface. Leaves covered by these numerous warts are unable to properly perform their functions, and the result in the following and subsequent seasons is an unhealthy growth and the gradual development of the



Fig. 35.—A GOOD CROP OF BLACK ALICANTE GRAPES.

Explanation: The vines figured were three years old at the time they bore the crop shown growing thereon. (Photo: H. A. Smith.)

disease known as "shanking." The proper course is to remove the superfluous growths tentatively. Do a little at a time, and never allow sub-laterals especially to develop fully before removing them. If done gradually no undue strain is placed upon the cells, and there will be less likelihood of warts forming on the leaves.

**Overcropping.**—Nothing does so much serious injury to a vine as allowing it to carry a too heavy crop of fruit. It should be remembered that the process of seed formation, apart from the berries, lays a heavy tax upon the resources of the vine, and that if all its energies are required to develop seeds it has no opportunity of manufacturing reserve food for the sustenance of the next year's crop; consequently that will be a poor one. To keep vines in a healthy bearing condition, and to ensure fine, good-flavoured berries annually, do not allow a vine to carry a heavier crop than that recommended on page 51.

**Using Paraffin and Spirits on Vine Rods.**—

Paraffin oil and methylated spirits are often used on vine rods for killing mealy bug. In using these remedies be careful not to touch the wood with them, only the insects. Both readily soak into the bark and bast cells, and destroy the tissues. We once saw a splendid lot of vines ruined by the careless application of these liquids to the rods, spurs, and buds. Again we repeat, touch the insects only, not the wood.

**Scalding of Vine Foliage and Berries.**—The foliage of the vine is very tender and easily injured. So, too, are the delicate skins of the berries. The scalding or browning of the leaves and berries is done by allowing the sun to shine on them when covered with condensed moisture or water from a syringe. This usually happens early in the morning, when the sun is rising. To guard against such an accident, syringing should be done by 7 a.m., and the ventilators be opened a trifle as soon as the sun begins to shine brightly, in order that the condensed moisture may be evaporated and the surface left dry by the time the sun becomes powerful. On cloudy days the same mishap is likely to occur, hence a careful watch should be kept on the ventilation. Nor should the berries ever be touched by the hand or head, otherwise they are sure to be discoloured.

**Cracking of Grape Berries.**—The berries of grapes often crack when ripe, or nearly so. This is due to the atmo-

sphere being kept too moist. When a berry is ripening sugar is in process of formation within, and this, by what is known as endosmotic action, absorbs through the skin any moisture which condenses thereon, just in the same way as a lump of sugar absorbs any liquid with which it comes in contact. The result is that the flesh of the berry becomes overcharged with moisture, and the skin, being unable to withstand the pressure from within, cracks. The remedy is to keep the air dry while the fruit is ripening, and also when ripe.

**Growing Vines with Plants.**—This subject has already been treated upon earlier in the book, but there are one or two points that want to be mentioned here. First of all, many amateurs would like to grow a grape vine in a greenhouse measuring nine by six feet. It cannot be done, because there is really not sufficient room for the plant to develop, and to attempt to restrict its growth if planted out in a border would only end in failure. A pot vine might be grown, however. In a house 12ft. by 8ft. one grape vine might be grown planted in a border. In larger houses devoted to vines the question sometimes arises as to what other fruits or plants might be grown in the same house. There is always a risk, when plants of any kind are grown in the same structure as vines, of the latter harbouring insects or diseases which may also attack the vines. Plants may only be grown when strict attention is paid to keeping them free from pests. Where the roof is not too densely covered with foliage, so as to exclude light, roses, figs, and peach trees may be grown on the back wall of a lean-to or three-quarter span-roof house. Vineries, too, may be used for wintering bedding plants, but care should be taken not to use artificial heat, except to just keep out frost. Too much heat in winter causes the sap to be active, and there is therefore a risk of "bleeding" occurring when pruning is done.

**Feeding Vines.**—Some beginners do not feel happy unless they are constantly dosing the roots of their vines with

liquid or artificial manures. While it is true that vines enjoy a liberal diet when in good health, it by no means follows that they want an excessive amount of feeding. They simply need to have the borders prepared as advised earlier in this volume, and the occasional feeding and top-dressings recommended at their various stages of growth. On no account do more. Furthermore, do not give manures to sickly vines under the mistaken notion that it will do them good. It will, on the contrary, only make them worse, and hasten their decease. A plant can only utilise extra food when it is in good health. Nor should manure under any circumstances be applied to newly-planted vines.

**Planting in Small Borders.**—The beginner is particularly cautioned against making the too frequent mistake of planting a grape vine in a bed of a few feet square. A vine will never grow in such a circumscribed area. Nor will it do any better if planted in a long, narrow border. A vine can only be grown properly in a border prepared and of the size advised earlier in this work. Nor can a vine flourish for long planted in a box or a tub. Grown under such conditions it would only fruit satisfactorily for one year. There are hundreds, we know, who attempt to grow vines under such conditions, and then wonder why they have failed to ensure continued success.



## CHAPTER XVI.

**HOW TO PACK GRAPES.**

A BUNCH of grapes or so is always an appreciable present to send to a friend, and as some of the readers of this Handbook may wish to do something of the sort, or even to despatch surplus fruit to market, it will be helpful to them to know the best way to pack the fruit so that it may travel safely. Grapes are tender fruit, and will not stand rough handling, so that it is essential they should be carefully packed.

**Best Receptacle for Packing.**—For one or two bunches a cheese basket, or any small wicker basket, will do. For several bunches the ordinary oblong wicker basket with a cross handle will suffice. Both forms of basket are illustrated. Besides the baskets, some wadding or wool and tissue-paper are also necessary to line the basket, and make a soft bed for the bunches. See Figs. 36, 37, 38, and 39.

**Packing the Bunches.**—Having selected the basket, line it with a sheet or piece of newspaper, then cover the paper with a thin piece of wadding, covering this again with a piece of glazed cap or tea-paper, or tissue-paper. As the bunches are cut, lay them in and secure firmly to the sides, so that the points of the bunches touch each other, and the centre of the basket when finished remains open. Insert a willow across the rim of the basket inside the border (or string put crossways will do); then fold a sheet of paper over the top, resting this on the willow or string, and tie down. A neatly-written card, "Grapes, with care," will do much to ensure safe arrival. Even if the grapes are to be carried any distance by hand this principle of packing is still the

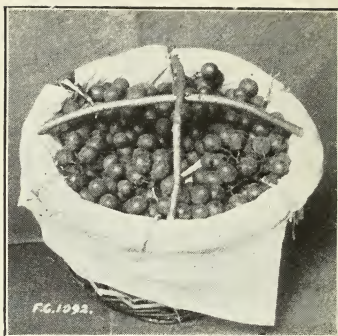


Fig. 36.—PACKING GRAPES IN A CHEESE BASKET.

Explanation: Here the grapes are shown packed in a paper-lined cheese basket, with a cross bridge of hazel sticks to protect the fruit.

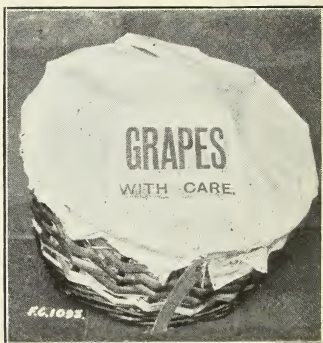


Fig. 37.—CHEESE BASKET PROPERLY PACKED.

Explanation: Here the basket (Fig. 36) is shown covered with stout paper and duly labelled for transit.

right thing; really, it is simply laying the bunches round securely, so that each bunch can be taken out, and if then carefully handled, laying it the same side down again, the

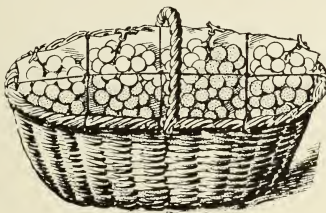


Fig. 38.—CROSS-HANDLED BASKET.

Explanation: This is a cross-handled basket, lined with paper, and protected with strands of stout twine.

bloom will be perfect. It is a good plan also to fasten the top of the bunch securely to the basket by means of twine run through the side. The bunch when cut should have a

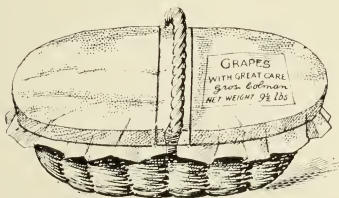


Fig. 39.—BASKET PROPERLY PACKED.

Explanation: The same basket duly covered with paper and labelled ready for its journey.

piece of the lateral removed with it to form a sort of handle, and it is this portion that should be secured by twine to the basket.

No one need be nervous about packing grapes as above described ; a very little practice will make perfect. Unless the basket be wilfully ill-used, such as turning it over, no ordinary shaking will injure the grapes. We sent a basket packed thus a railway journey of 500 miles, and it arrived in perfect condition ; comment is superfluous. If it be really necessary to include a bunch or two of grapes in a mixed basket, glazed cap paper, after the usual lining for them to rest on, will be the best thing to keep the berries from rubbing ; even if wrapped in sugar-paper fashion, beyond the prominent berries being rubbed, they will take no other harm. Always be sure every berry is sound before laying it down, or this will wet and spoil the bunch.

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## CHAPTER XVII.

### EXHIBITING GRAPES.

THIS is one of the fine arts in gardening, and requires practice to become efficient. It frequently happens that one man exhibits grapes and wins the first prize with inferior bunches to those which only get the second one.

**Points of Exhibition Grapes.**—The secret of exhibiting grapes is to display the bunches on the exhibition boards so that they look exactly as they did when they were growing on the vines. To do this, the bunches must be so thinned that each berry has room enough to grow without being squeezed out of shape, but at the same time be held upright in a natural position when the bunch is placed on the show board. Grapes intended for exhibition should never be syringed after they come into flower, because syringing has a tendency to wash the bloom off the berries. The berries

also should be quite free from rust, scalds, or shanking. The bunches chosen should be symmetrical in shape, graduating evenly from the shoulders down to the bottom of the bunches. Those with very large shoulders are not so effective, even if the bunches be a little larger. A medium-sized bunch, with large, well-coloured berries, having a dense bloom on the berries, is better than a larger bunch with smaller berries which are not well coloured, and having also less bloom on them. The colour of black grapes should be as black as that of sloes, having also the dense bloom of the sloe. The so-called white grapes should be of a deep golden-amber, having

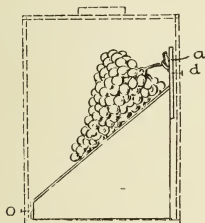


Fig. 40.

SECTION OF A SHOW STAND.

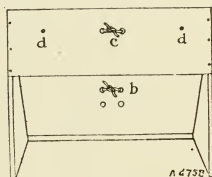


Fig. 41.

BACK OF SHOW STAND.

also a dense bloom, but which, of course, is not so conspicuous as the same amount on black grapes. Varieties which are known to possess high quality will always win, if the bunches and berries are equal, or even a little inferior in appearance, to poor-flavoured varieties. The Muscat of Alexandria (white) and Madresfield Court (black) are the best examples of high quality in grapes.

**Staging the Bunches.**—The show stand and box must be in perfect readiness before the bunches are cut. Fig. 40 shows a side view of the stand, with the bunch fastened on to it, the stem being secured by passing a piece of

string through the two holes and tying at the back, as shown at *c* in Fig. 41. The front of the board should first be covered with a sheet of cotton wool, and then with clean white paper. When the board is ready the bunch should be cut with about three inches of the shoot attached, as shown at *a*, Fig. 40. The bunch should be held up by one person while another very carefully puts a piece of rather fine string round the stem, about two-thirds down the bunch. A pair of grape scissors and a crochet needle are handy instruments for putting the string between the berries to get the string round the stem. Choose the flattest side of the bunch, that being the best side for it to lay on the board, so that the little rubbing the berries may get in passing the string through will be on the side which will be out of sight. This string must now be passed through the two holes half-way down the board, as shown at *b*, Fig. 41. There are four holes shown at the back of the board; the bottom two are to be used for a longer bunch. The top part of the stalk (*a*) must now be tied to the stand by passing the string tied to it through the top two holes, as shown at *c*, Fig. 41, and tied securely, using a stronger piece of string than that used lower down; after which the lower string (*b*) must be tied as tight as it will permit without crushing the berries; this is to prevent the bottom of the bunch rolling about in transit, which would cause the bloom to get rubbed off the berries. When the bunch has once been put on the board it must never be taken off or rearranged, or the berries will be sure to become rubbed.

When the bunch is secured, the stand should be carefully put into the box, as shown by the dotted lines around it. Two screws should be put through the back of the box into the top of the stand, as shown at *d, d*, Fig. 41, and another screw put in the front, as shown at *o*, Fig. 40. These will prevent the stand moving about in the box. The lid should then be shut and locked.

The box is best carried by hand to the show, or to and from the station, because the jolting of a cart over rough stones is almost sure to disfigure the bunches. When the

box arrives in the tent the screws must be taken out, the lid opened, and the stand lifted out and placed in position on the table. The angle given in the sketch is about 45 deg., which is generally the most suitable, but if the berries are a little loose through being overthinned the back may be propped up a little to give it a sharper pitch. It is best for beginners to practise by tying on the stand a bunch which is not to be shown.

Boxes and stands may be made to hold two or three bunches of grapes, allowing the bunches to be nine inches apart, and four-and-a-half inches from the outside.

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## CHAPTER XVIII.

### ENEMIES OF THE VINE.

**Red Spider (*Tetranychus telarius*).**—This is one of the worst pests to vines under glass. A bad attack will prevent the grapes ripening properly, and also injure the crop the following season. Its presence is first indicated by a few brown patches on the leaves. These patches may become as large again the following day if it is a hot one, and the pest may spread through the whole house in a fortnight in hot weather. Plenty of moisture is the best prevention, but it will not cure it. When the spots are first seen, each affected leaf should be sponged, or brushed, with soft soap and sulphur. Mix four ounces of soft soap with one ounce of flowers of sulphur, and pour on to it one gallon of boiling water, and stir until all is dissolved. Lay the upper part of the leaf flat on to your hand, then put the mixture on the under side with a new paint brush or sponge, drawing the brush to and fro so as to work the mixture into the crevices and between the ribs. The brush is rather better than the sponge for the purpose. After every affected leaf has been brushed, syringe very

forcibly with clear soft water. Red spider is nearly always on the under sides of the leaves, but they go to the top of the leaves when the sun is shining, in which case the brushing is best done when there is no sunshine. As soon as the grapes are cut syringe the whole house and vines with the same mixture at a temperature of 180 deg., or with five ounces of Gishurst Compound to each gallon of water. Sulphur evaporised is a sure cure for red spider in summer, but there is a danger of it causing rust if done when the berries are small. Thoroughly brush the rods over in the winter with eight ounces of Gishurst Compound to each gallon of water, working it into all the crevices and around the "eyes."

**Thrips (*Heliothrips Adonidum*).**—This is sometimes a troublesome pest. Its presence is first noticed by brownish patches, with a silvery brightness on the surface of the leaves. When only a few leaves are affected, the leaves should be sponged with soft soap and tobacco water, mixed together. But if the thrips come from plants in the house, it would be better to fumigate with one of the nicotine compounds, and repeat again in four days.

**Mealy Bug (*Dactylopius Adonidum*).**—This is the most disagreeable pest of all when it gets among the bunches, which it is sure to do when there is a bad attack; and the grapes then are not fit to eat. The grapes should be cut as soon as possible after they are ripe, and put into bottles, and taken into a dark room. Then syringe the house with a paraffin emulsion, made as follows: Take two or three shovelfuls of fire from the vinery fire, and put outside surrounded with bricks. Place a saucepan over the fire which will hold three or four gallons. Put into the saucepan two pounds of best soft soap and four ounces of washing soda, with half a pint of soft water. Stir the soap briskly while boiling with a good handful of twigs from a birch broom. When dissolved pour into it one gallon of good paraffin, and continue to stir briskly for fifteen minutes after it has boiled, taking care that it does not splash over into the fire. Take it off the fire and continue stirring until it comes into a stiff paste.

Add to this thirty gallons of boiling water, and thoroughly syringe the vines, and everything in the house—even the rods right down into the ground. Do this again three or four days after, and if properly made and used no mealy bug or any other insect will be alive, and it will not injure the vines. But it should be done before the leaves begin to decay. Dress the vine rods in the winter with eight ounces of Gishurst Compound to each gallon of water, working it into all the crevices with a half-worn-out paint brush. A careful watch should be kept the following summer, and if a mealy bug be seen just touch it with a small brush dipped in spirits of wine.

**Vine Louse (*Phylloxera vastatrix*).**—This is very injurious to the vineyards on the Continent, and has also done a great deal of damage in some places in England, attacking both leaves and roots. When the leaves are attacked they have a warty appearance, and the roots become covered with knots. The only sure remedy is to burn the vines and roots, thoroughly clean the house with paraffin emulsion, and paint all the woodwork; then take all the soil out of the border and make a new one.

**Shanking.**—Shanking is generally caused from the lack of sufficient food to supply the demand made upon the plant by the crop. This lack of food may be from one of several causes. It is very often the result of overcropping of either the year in which it is seen or some previous year; a bad attack of either red spider or mildew, which robs the leaves of nutriment, and prevents them carrying on their work; a wet, cold subsoil or one that has too much animal manure in the border, causing late autumn growth, the roots afterwards dying back during winter. If the borders are made as advised in previous chapters, and kept regularly mulched so that the roots are near the surface, shanking will not take place from this cause. Lifting the roots and bringing them near the surface, as advised in renovating old vines, will remedy the evil if the roots are at fault. This disease causes the berries and stalks to shrivel instead of developing, and is easily recognised.

**Rust.**—This is generally caused by some check to the berries when they are quite small and tender. Putting on a lot of ventilation when the house has become very hot will cause it. Syringing the pipes when they are very hot, and causing a large volume of hot steam, will also promote the development of rust. Putting sulphur on the pipes and making them hot when the berries are quite small will have the same effect. There is no cure for rust, but it can be prevented by abstaining from doing such things as mentioned above.

**Warts on the Leaves.**—Warts, when they are extensive, interfere with the functions of the leaves, but slight cases of wartiness are not very harmful. It is frequently caused by a check, such as ventilating too freely when the house is very hot; improper removal of foliage, etc. See remarks on p. 85.

**Scorching.**—This is caused by not ventilating early enough, by closing too early, or insufficient ventilation in hot weather.

**Scalding.**—This takes place when the berries commence to swell again after stoning. The berries become red on one side and gradually decay. In bad cases the bunches are spoilt. Early ventilation, with an abundance of air on bright days, will generally prevent it. See also remarks on p. 86.

**Air - Roots.**—These sometimes grow out round the spurs and young shoots. This is occasionally caused through defective root action, the result of the roots being in a cold subsoil. Too much moisture, with insufficient ventilation, will cause them to grow. When this is the cause, more ventilation at once checks their growth. Although most gardeners do not like to see them, we have not found them an evil when not too numerous.

**Mildew (*Uncinula spiralis*).**—Vines grown under glass and in the open air are often attacked by a form of mildew peculiar to the vine (Fig. 42), and as amateur grape

growers ought to be able to recognise the fungus in order to deal promptly with it, we give full details of its life history, with the best remedies for its eradication. If allowed to develop on the shoots, leaves, and berries it is liable to do serious injury to them.

The mildew appears on the surface of the leaves, etc., in the form of a greyish-white powder. The powdery appear-

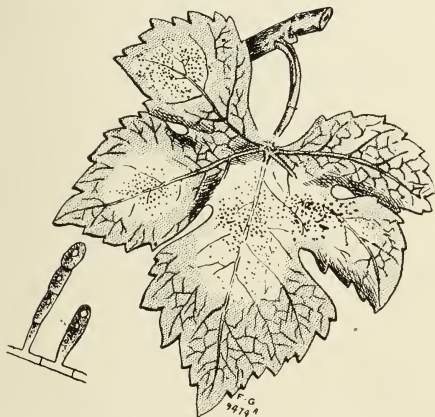


Fig. 42.—VINE LEAF ATTACKED BY MILDEW.  
Showing patches of mildew growing on the surface of the leaf.

ance is due to the presence of myriads of minute summer spores, which are produced in enormous quantities, and in quick succession throughout the summer months, and accumulate on the mildewed patches until removed by wind or rain, and such of those as happen to alight on the damp surface of a vine leaf germinate quickly, and soon produce a patch of mildew. The spores are oval, and are formed in

chains, the uppermost spores of the chain becoming free and falling away as soon as they are ripe, young spores being at the same time developed at the bottom of the row or chain. The mildew develops on the upper surface of the leaves, young shoots, and fruit.

During the autumn the summer form of fruit ceases to be



Fig. 43.—VINE LEAF ATTACKED BY "BLACK ROT" DISEASE.

produced, and in its place minute balls, at first yellowish, and afterwards blackish brown, appear in considerable numbers on the mycelium still present on the leaves, shoots, and fruit. These minute balls, smaller than the head of a small pin, represent the winter form of fruit, containing spores in their

interior. Examined under a microscope, these winter fruits are very beautiful, being provided with a circle of delicate spreading spines, each of which is more or less curled at the tip. These winter fruits remain unchanged until the following spring, when the spores escape and inoculate the young leaves and shoots, giving origin to the summer form of fruit.

In the matter of applying fungicides it is all important to remember that no one mixture, however valuable, can be looked upon as a preventive or cure for all known fungoid

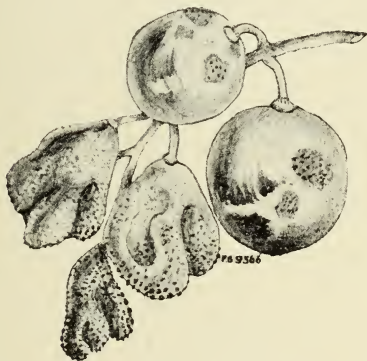


Fig. 44.—GRAPES INFECTED WITH "BLACK ROT."

diseases. Flowers of sulphur is very effective against vine mildew. Special bellows should be used to secure a thin and even dusting of the substance on the leaves, shoots, and flowers. The first application should be made when the leaves are just full grown, and a second when in full bloom. A third application should be made about a month later if the disease is not stamped out. The most certain result is obtained with the temperature ranging from 80 deg. to 100 deg. Fahr.

Excellent results also follow spraying with a solution of potassium sulphide. This preparation is cheap, and can be effectively applied with any form of sprayer, and, being perfectly colourless, leaves no marks on the plant. The times for application are the same as for flowers of sulphur. It is prepared as follows:

Potassium sulphide, or liver of sulphur ...	2 ounces.
Water ... ..	3 gallons.

The sulphide dissolves readily in water, when it is ready for use. This solution should be carefully used, otherwise it will discolour white paint.

Shoots that are attacked should be removed and burned, as the winter fruit is not destroyed by the fungicides mentioned. Fruit should also be promptly removed when it shows indications of the disease, as it cannot possibly be of any value, and may serve to spread the disease if allowed to remain on the vine.

Finally, scrupulous care in collecting and burning fallen leaves and fruit that are diseased must be attended to, otherwise a single shrivelled berry or fragment of a leaf hiding in some crevice may be the means of introducing the pest the following season.

**Black Rot of Grape Vine (*Guignardia bidwellii*).**—This disease (Fig. 43) is not very common in Britain, but still it is just as well that readers should be acquainted with its life history, and the best way of coping with it. The general appearance produced by the disease is well marked, and when once seen is not likely to be confounded with any other form of fungous attack. The young leaves, and especially those low down on the vine, are usually the first to show the symptoms, which appear under the form of irregularly shaped brown blotches, half to one inch across, looking like the effects of sun scald, for which they might easily be mistaken but for the presence of numerous minute black points scattered over the surface of the diseased patches, which correspond to the fruiting organs of the fungus, which

can be clearly seen under a magnifying glass. Three or four different kinds of spores, or reproductive bodies, are produced by the fungus, each of which is capable of infecting and causing the disease on any leaf or fruit on which it may happen to be deposited, providing the surface be damp; the spores cannot germinate on a dry surface. As a rule, about a month after the disease has appeared on the foliage the fruit is attacked. Blotches of variable size appear on the grapes, and after a few days these blotches are studded with minute blackish warts—the fruit of the fungus. Within a short period of time the diseased grapes become dry and much shrivelled, but remain hanging for a considerable time. During the winter numerous minute black sclerotia or hardened masses of fungus mycelium form in the skin of the fruit, and in the following spring, about the time when the leaves are unfolding, these sclerotia produce two distinct kinds of fruit, either of which is capable of infecting the young leaves, thus producing a repetition of the disease.

The fungus can only spread to any extent when the temperature is fairly high, and the air contains a considerable quantity of moisture. In this country, where vines are grown under glass, those conditions most favourable for the development and rapid diffusion of the fungus are constantly present, and great care must be exercised in the matter of ventilation, so as to avoid an undue deposition of moisture on the surface of leaves or fruit; and, furthermore, ventilation must be so effected that the fruit is quite dry before being exposed to sunlight, otherwise rusting of the grapes is apt to occur, a feature bad enough in itself, and, in addition, greatly favouring the spread of the disease. If the disease be present, spraying with dilute Bordeaux mixture is the best that can be done; application should be made at intervals of ten days until the grapes are the size of peas, when Bordeaux mixture should be replaced by an ammoniacal solution of carbonate of copper, which will not spot and disfigure the fruit.

Diseased leaves and fruit should be collected and burned, and it is very important that such diseased portions should not be allowed to fall and remain through the winter on the

ground or in neglected corners, otherwise the sclerotia present in the tissues will produce spores the following spring and infect the young growth.



Fig. 45. - DOWNY OR FALSE VINE MILDEW.

Ammoniacal solution of carbonate of copper is prepared as follows :

Water	... ..	16 gallons.
Carbonate of copper	... ..	1 ounce.
Carbonate of ammonia	... ..	5 ounces.

Dissolve the carbonate of copper and carbonate of ammonia in a little hot water, then add the remainder of the water.

**Downy or False Mildew** (*Plasmopara viticola*).—

This fungoid disease is of American origin, and “makes its appearance,” says Dr. W. G. Smith in his “Diseases of Plants” (Longmans and Co.), “in early summer as white patches on the under surfaces of the leaves; sometimes also on the stalks and fruit. In the course of the summer the leaves show brown spots, and dry up.” It seems that the disease is most prevalent in moist weather, and hence it naturally follows that vineries which are not properly ventilated will provide suitable conditions for the development of the fungus.

**REMEDIES.**—Spray the foliage, as soon as the berries have formed, every ten days, with the ammoniacal solution of carbonate of copper, the formula for which appears on p. 104, or with the Woburn Bordeaux Emulsion. These remedies must not be applied after the berries begin to colour.

**Cushion Scale** (*Pulvinaria vitis*).—Vines are occasionally attacked with this scale, which get on to the young shoots, and sometimes on the leaves and bunches, making them very dirty by their excrements. They are more easily seen by a white cottony substance which protrudes from under the scale in the summer time, and in which the young scales are enclosed. The winter washing recommended on p. 39 will get rid of these pests, if properly done with a stiff brush.

**Mussel Scale** (*Mytilapsis vitis*).—These are very small scales in the shape of mussels, which are sometimes found on the vines; their presence may be noticed by the dirty leaves and berries. Care must be taken to burn all the leaves and prunings when they are taken off in the autumn. The rods should also be carefully washed with a stiff brush in the winter, as recommended on p. 39.

## CHAPTER XIX.

**A YEAR'S WORK AMONG VINES.**

**January.**—Examine daily all bunches, both in the vinery and in the grape room, and remove all decaying berries, turning the bunches carefully round with the stick used for thinning. If one berry has gone quite bad, it is best to remove the other berries which were touching it. See that there is no decaying refuse in the room where grapes are hanging, or anything which will cause moisture or decay in the houses. All grapes should now be cut and put into bottles, if space can be found for them in a cool room. Cut off with each bunch as long a piece of wood as can be spared, leaving two eyes for the spur, so that no further pruning will be required. (See chapter on Keeping Grapes for instructions.) All vines should be pruned as soon as the grapes are cut, because late pruning often causes bleeding. All woodwork and glass should be washed with soft soap and water, in which a little carbolic acid has been added. All vines should be washed with Gishurst Compound; this is a safe and effective remedy for destroying insects and mildew, and does not injure the vines. It should be thoroughly worked into all the crevices and around the buds. The loose, ragged bark may be pulled off, but vine-rods should never be peeled closely. Many vines have been permanently injured by this bad practice. The walls should all be washed with fresh lime, in which some flowers of sulphur have been mixed. If the borders are inside take an inch or two of the surface soil away until some of the roots are seen; give a dressing of lime, raking it into the soil, or half-a-pound of basic slag may be used instead; then fill up with fresh turf, in which one pound of bonemeal has been added to every bushel of turf. Paint the pipes with

linseed oil and lampblack, mixed together, which is better than paint. Early vines which were started in November will now be in flower, and a night temperature of 65 deg., with a day temperature of 75 deg., must be maintained, rising to 90 deg. by sun heat. Put a little air on at top before eight o'clock, and at the front by nine o'clock. Draw a soft feather brush up and down the bunches once or twice about two o'clock in the afternoon, to assist fertilisation. Damp the houses down at closing time only during the flowering. The shoots should be tied down to the wires just as the flowers begin to open, at which time they are not so liable to break off as when tied earlier. Do not leave the shoots too close together. The leaves of early forced vines are not so large as those on later vines, so that they may be left sixteen inches apart on each side of the rods. Pinch the points out of lateral growths above the first leaf when that leaf is the size of a shilling. See to the disbudding in vines which are just starting into growth, and finally disbud the shoots when the bunches are showing.

**February.**—Continue to examine all bunches, and remove all decaying berries. Empty the water out of the bottles from which grapes have been taken. The earliest grapes will now be ready for thinning (see chapter on Thinning). The night temperature should not fall below 60 deg. unless the weather be severe, rising to 72 deg. by day with fire heat and to 90 deg. by sun heat. These figures may rise 5 degrees higher in very mild weather. Keep all laterals removed as soon as they are formed; it is a great mistake to allow these to grow a foot long before removing them, because they are taking the food which should go to the bunches, and when they are removed all at once it gives a check to the vines, which is also injurious. Examine inside borders with a fork and trowel to a depth of eighteen inches, and, if dry, give a good watering with warm water, and repeat in a week, giving manure water immediately after. Muscats and other late-keeping grapes such as Gros Colmar and Gros Guillaume, should be kept close by the end of the month,

keeping a moist atmosphere and syringing two or three times a day. The night temperature should now start at 50 deg., rising to 55 deg. in a fortnight, with 80 deg. by sun heat. It is much better to start these varieties rather early to give them a long season of growth than to have to fire in the short days to get the fruit to ripen. Lower the rods to a horizontal position, so that the bottom buds may start with the top ones. Add new sections to the vine borders when the last-made part is filled with roots. If the turf be cut in frosty weather or immediately after, wireworms, grubs, and other vermin will have gone lower in the soil, and the turf will not contain them. For this reason turf should be cut and stacked for use during the summer if vine roots are to be lifted. Vine "eyes" should be put in now if young vines or pot vines are required. (See chapter on Propagation.) Unheated houses should have abundance of air to prevent the buds starting too early.

**March.**—Continue to examine all bunches, and remove bad berries, emptying the water from bottles which are not in use. Do not use artificial heat unless absolutely necessary, because the grapes will keep more plump without it. The earliest grapes will be stoning now, and the temperature should be kept as regular as possible; high temperature, especially with early closing, is injurious to them. The night temperature should not rise above 60 deg. on cold nights, but may rise to 63 deg. on mild nights, and 85 deg. by sun heat, closing with a temperature of 75 deg. At the same time they must not have a low temperature, to cause a check. A watering with clear lime water is beneficial at the commencement of stoning. Pay attention to those vines started later, pinching the points out when they have made two leaves above the lowest bunch, when the second leaf is the size of a shilling, and stopping the side growths as soon as they have formed one leaf the same size. If shoots are growing against the glass, tie a piece of raffia to them and sling it to the wires, but do not tie down to the wires until the grapes are coming into flower; they will be tough enough then to be tied down

without breaking. Pinch off all bunches but one on each shoot as soon as it can be seen which is the best one. The weight of the crop must be estimated before any further bunches are removed. If there are too many bunches, then the smallest and the worst shaped must be removed. A pound of grapes, when ripe, to every foot of rod is enough for a general crop, but even that number is too much for very early forcing. If the crop be too heavy the berries will not ripen satisfactorily, and the vines will be weakened for the following season. If brown spots are seen on the centre of the leaves it is almost sure to be caused by red spider; a close examination of the under sides of the leaves will show if it is there. Sponge or brush them over with weak Gishurst Compound, or soft soap and sulphur. Syringe forcibly afterwards with clean soft water between the bunches. It sometimes injures the bloom on the berries to syringe them, but the water falling back upon them will not hurt them. The syringings should be repeated for a few days at closing time, but air must be admitted earlier on the following mornings, and the vine-rods be shaken early in the morning to shake the wet off. Young vines should now be planted. Shake the soil away from the roots when it is quite dry. Spread the roots out along near the front of the house, and cover first with a little leaf-mould and sand, and then with the prepared turf, as previously advised. Give sufficient warm water to moisten the soil, and cover with a little long manure. Vines in unheated houses should be encouraged to break by giving less ventilation on cold and dull days, and closing entirely on frosty nights; but do not attempt to hurry them, as they will become too tender to stand cold weather later on.

**April.**—Where blinds can be found for unheated houses the vines may be encouraged to grow without fear of their being injured by frosts later in the season. Roller blinds are the best, and it is money well spent to purchase them, both for spring and autumn use. These blinds can be let down on cold or frosty nights, and the vines may grow away unchecked. Rub off all weakly shoots which are not wanted as

soon as they commence to grow. The earliest grapes will now be ripening, and a little more ventilation will be needed, leaving a little on all night, but extra fire heat must be used to keep up the same temperature. Plenty of moisture must still be given, but the house must never be quite closed, as the berries may crack. A little front air should be put on before the temperature rises in the morning; it is a stagnant atmosphere that causes cracking. Grapes coming into flower should have their shoots tied down. The sun will then shine better on to the bunches before the leaves are rearranged; this will assist the fertilisation. The rods should be tapped about two o'clock on bright days, and the feather brush should be used on dull days. If mildew appear, mix some sulphur with milk and paint the pipes in the afternoon; then make the pipes very hot, but not near boiling. This must not be done when the grapes are in flower or when the berries are small, or it will cause rust. Syringe the affected parts with one ounce of liver of sulphur (potassium sulphide) to three gallons of water, when the pipes cannot be sulphured. This should be washed off with clean soft water an hour after. The winter mulchings on outside borders should be removed at the beginning of the month, and the surface of the border be lightly forked over about an inch deep, so that the sun and air can get in to warm and sweeten the border. Never plant or sow seed on vine borders if you want good grapes. Mulch inside borders where grapes are in active growth.

**May.**—Outside vines will require the same treatment in disbudding where too many shoots grow out from the spurs, rubbing all the weak ones off as soon as they are formed. Leave only the two best ones on each spur, and one of these can be removed as soon as it is seen which has the best bunch. Unheated houses should be carefully ventilated, so that a growing temperature may be kept up without checks from the ventilators being opened wide at one time. The same care should be taken in gradually closing in the afternoons, that the house may be kept warm throughout the day, making as

much use as possible of the heat from the sun without drawing the shoots up weakly. Throw water on the paths at closing time, but open the top ventilators before dark. Vines can stand greater extremes between day and night than most other plants, and appear healthier than when kept at a more uniform temperature which they so frequently receive in heated vineries. The points should be taken out of the shoots beyond the first leaf above the lowest bunch on each shoot. One leaf is better than having two above the bunches in unheated houses, because the leaves are larger, and the joints between them are longer than those in heated vineries. Remove all tendrils, and stop the side growths to one leaf. Fires must be discontinued as soon as the grapes are ripe in early houses, and the ventilators be kept wide open until near sunset, when the top ones must be sufficiently reduced to prevent rain beating in during the night; but the front ventilators should be left open all night. The side laterals on these vines should be permitted to make two or three leaves, when their points should be taken out. This extra growth prevents the back buds from breaking. In vineries where the grapes are just beginning to colour, a good watering should be given to the inside border if it requires it; a great amount of moisture is required at the root at this time. Ventilate freely on all occasions, but keep the temperature up by extra fire heat. The day temperature by sun heat should be 95 deg. and the night temperature 65 deg. With longer days the greater sun heat will permit these temperatures being kept. Grapes which are commencing their second swelling, after stoning should have an increased day temperature, rising to 95 deg. by sun heat, closing early with plenty of moisture in the house and opening the ventilators slightly before dark. Examine the borders inside, and give water if required, finishing with liquid manure. Keep all laterals closely pinched. In later houses pinching should be continued, also tying the growths down to the wires as the bunches come into flower. Pinch the points out of young vines when they have grown about six feet. The side shoots should not be pinched at the same time, it being better

to wait until a new leader is formed before doing so. The side shoots should then be pinched above the second leaf. These pinchings plump the buds up on the young rod.

**June.**—Outside borders will now have become warm by the sun, and an examination should be made to see if they are dry. If water be required, give sufficient to thoroughly moisten the soil down to the drainage, finishing with liquid manure. Immediately after watering, mulch with about four inches thick of stable manure to prevent the moisture evaporating. Unheated houses should now be ventilated with the same care as those artificially heated, giving only sufficient to prevent the leaves becoming scorched. Tie the shoots carefully down to the wires when the flowers are opening. The shoots in these houses are more tender than those in heated houses, and will soon break if tied too early or too closely. Vines in greenhouses must have their shoots and side growths regularly stopped, so as not to exclude light from plants underneath them. Only one leaf should be permitted to grow above the bunch, and every other one of the side growths be pulled off. Plants under vines should always be stood farther apart than in houses devoted entirely to them. Plants which have any insect pests on them should be taken outside, laid on their sides, and be thoroughly syringed with an insecticide. Most pests are difficult to get rid of when once they infest vines. When the vines are in flower give the rods a tap about two o'clock, and a little heat should be kept in the pipes day and night; a good set is worth the extra fire. The plants should only be watered in the afternoon at closing time when the grapes are in flower. Muscats in flower must have the hot water pipes regularly warm both day and night, with a temperature of 70 deg. by night and 80 deg. by day, with 95 deg. by sun heat. The bunches should have the feather brush drawn up and down them two or three times each day, commencing about two o'clock while they are in flower. The above temperatures should also be maintained when the berries are swelling.

Muscats finish their fruit so much better with plenty of heat that it is a mistake to allow the temperature to fall during a spell of bad weather. Give plenty of water at this stage, followed by liquid manure. It will not be easy to over water if the drainage is good.

**July.**—The grapes in greenhouses should be well thinned, which assists them to keep better when they are ripe in houses where moisture is continuous through the constant watering of plants. Examine outside borders, and water freely if required; a great amount of water is taken up by vines during long days of bright sunshine, much of which is evaporated by the leaves. An insufficient supply soon brings on an attack of red spider or mildew. If the borders get too dry when grapes are ripe the latter soon shrivel. In vineries where the grapes are cut the foliage should have a good washing with the garden engine. If there are any signs of mildew or red spider syringe with the liver of sulphur remedy the following evening. The ventilators should be wide open day and night. Vine borders should have a watering of lime water in houses where the grapes are stoning, using one gallon of lime to eighteen gallons of water. This not only helps the stoning, but it sweetens the borders, destroying acids which may have accumulated by using manure water. Liquid manure should be given again as soon as the second swelling commences. The last dose of liquid manure should be given when the berries begin to colour. Continue the stopping of growth until the grapes are ripe, at which time all the side growths should be permitted to make two or three leaves before being again stopped. It is a mistake to allow vines to make a lot of growth, to be afterwards cut back. This bad practice frequently gives a serious check to the growth of the vines, bringing on some defects in the bunches or berries, the cause of which is not suspected. Attend to the stopping of outdoor vines on buildings, and leave only one bunch on each shoot. The shoots should be nailed close to the wall, which ripens the grapes much earlier and better than when left growing from the wall.

**August.**—It is a good plan to shade houses in which grapes are ripe. A good whitewashing answers the purpose, and helps to prevent the berries shrivelling and losing their colour. Give abundance of ventilation in fine weather, but a little fire heat should be put on in wet weather to prevent the berries cracking or going bad, always keeping a little ventilation on both front and back when the pipes are warm, a stagnant atmosphere being fatal to ripe grapes. Vineries in which fruit is swelling should have an abundance of moisture thrown down on the paths in bright weather, during the days and also in the evenings, this being necessary to keep the foliage healthy and free from red spider. Muscats should still have a little fire heat if the grapes are not approaching ripeness. If the foliage be very thick when Muscats are ripening some of the side growths should be removed to allow the sun to shine upon the bunches; this will give that deep golden colour so much admired in these grapes, and which always yields the best flavour. Sponge or brush the leaves on the first indication of red spider, using sulphur and soft soap diluted in water. Such grapes as Lady Downes and Madresfield Court are subject to cracking when they commence colouring. A little ventilation on all night both front and back, increasing it early in the morning when the sun begins to shine upon the house, will prevent it. But sometimes this is caused by the border getting too dry before water is given. An occasional examination of the border is the safest plan, although vines cannot easily be over-watered in August if the drainage be good. If it is desirable to force vines earlier next year than they have been forced this year, the border should be kept rather dry to induce an early rest. The bearing shoots in this case should be cut back to five leaves, and all the side shoots be removed; this will plump up the back buds and also induce rest. Pot vines should be taken out if the young rods have become brown, and nailed to a south wall, shading their pots with boards or bags.

**September.**—Wasps are often very troublesome during this month where grapes are ripe. Many gardeners use fine

netting over the ventilators to prevent them getting in. This often prevents sufficient air coming to the vines, and the houses become so hot that the grapes soon shrivel, so that the remedy is nearly as bad as the wasps. The best remedy we have found is to use a wasp destroyer, which can be obtained from any sundriesman. One drop put into the berries which are attacked, with a small pointed stick, will clear the house of wasps in an hour, and destroy all the wasps that have found the grapes. This will have to be repeated in a week, or less perhaps, when other wasps may have found the grapes. You may destroy a hundred nests and still have as many wasps in the vineries, hence we find it better to destroy those only which come into the house. Young vines are sometimes so vigorous that means must be taken to check their vigour in order to get the wood ripe. This is best done by reducing the side growths gradually until all are cut back to the main one. Vines for early forcing, to be started in November, should now be pruned back to two good buds. Wash the rods with the compound previously mentioned, and clean the house throughout. This early pruning gives the vines a more complete rest than when they are left unpruned until a later period. This is the best time to lift the roots of vines which are in an unsatisfactory condition, but the grapes must be cut before doing so. Turf should be used which was cut in early spring and stacked for the purpose. This should be chopped into portions three inches square, and to every eight loads of turf add one load of old mortar broken small, half a load of wood ashes made from burning garden refuse, prunings, etc., and three bags of charcoal dust; add also 25lb. each of basic slag and bone-meal to each ton of turf, and mix well together. Get out a trench, two-and-a-half feet deep, twelve feet from the front of the house, cut all the roots asunder, then gradually remove the soil with a fork from among the roots, taking care not to injure them. The roots should be tied together loosely in bundles, and covered with wet bags to prevent them getting dry until all is finished. The new soil should then be put under them, and the roots turned towards the house. Notches should be cut in all the

large base roots about ten inches apart, which will cause new roots to break out from around the cuts. The uppermost roots should be within six inches of the surface when they have been covered with the new soil. Give the whole border just sufficient warm water to moisten the soil, and cover the surface with six inches of long manure. The vines inside the house should be kept well syringed to prevent the leaves flagging, and the house be well shaded for two or three weeks, by which time new roots will be formed. Pot vines for very early forcing should be pruned, applying the remedy advised on p. 82 to the cuts to prevent bleeding. Later pot plants should have their side shoots cut back to the main stem, and the pots taken out against a wall.

**October.**—Vines to be started the beginning of January should have their growths shortened back to four or five leaves at the beginning of the month, and pruned back to two buds at the end of the month. Early forced vines should always have two good buds at pruning, so that a choice of shoots can be made when the embryo bunches are showing. Brush the rods with Gishurst Compound, and clean the house throughout. The side growths should be shortened back in all the houses where the grapes are not ripe. The foliage must not be thinned too much where black grapes are ripe, because the sun shining upon them causes them to lose colour, but all leaves which may be touching the glass should be removed, because they hold the moisture and conduct it from the glass to the bunches of grapes. Apply fire heat in wet weather to dispel damp, with a little ventilation both front and top. Continue to use the wasp destroyer if wasps are troublesome. Remove all bad berries from ripe grapes. Where only a few bunches of grapes are left in any one house these should be cut and taken into a dark room and put in bottles of water. See that no decaying rubbish is left in the room. A few lumps of fresh lime put into a box in one corner of the room will help to dispel damp and arrest decay. (See chapter on Keeping Grapes.) When the grapes are all cut the vines should be thoroughly washed with the garden engine.

If red spider, mealy bug, or any other pests have been on the vines, give a good washing with paraffin emulsion, as advised in the chapter on Pests. Repeated washings at this time with paraffin emulsion does more to destroy pests than in the winter, when they are hibernating in cracks and crevices. Lift the roots and add new soil where vines are in an unsatisfactory condition, as advised last month. Remove all side laterals in unheated houses, and shorten the bearing wood to five leaves where there are no bunches, to restrict late root action and to ripen the wood and grapes.

**November.**—This is generally a trying month for ripe grapes, the air outside being cold, damp, and stagnant. The decaying fallen leaves are giving off germs of like destruction all around, which quickly attack the berries if the houses are cold and damp. A little heat should be kept in the pipes regularly, so that the air will be warm and light, and also above condensation point at all times. Air must be always kept on with fire heat, and should the houses by any chance become cold fire heat must not be put on without ventilation, or the grapes will crack or decay, the moist berries being just in a fit condition for spores to germinate on when the air is stagnant. Remove all decayed and decaying leaves from the vines as soon as they are formed. The bunches must be closely watched for any decaying berries; one of these will soon contaminate the others around it, and a whole bunch be soon disfigured and spoilt. Vines should now be started to have grapes ripe in April. Tie the vines down just below the horizontal line to induce the back buds to start with those at the top. A hotbed made half of fresh leaves and half horse droppings, having a little short, strawy litter with it, is a very great assistance in starting early forced vines. The manure and leaves should be thrown together into a cone-shaped heap outside to start fermentation, and also to sweeten it. When the steam is seen coming out of the top turn the heap inside out, spreading it out a little. As soon as it has become warm again take it into the vinery to be started, and make a mound three or four feet wide and the

same in height the whole length of the house. Double this quantity would be better if it can be spared for the purpose. The manure should be taken into the house the beginning of the month, and the house kept close for a week before fire heat is added; then start with a temperature of 45 deg., increasing it to 50 deg. in another week, gradually increasing it to 55 deg. by the time the buds begin to burst. Turn the manure over once a week, and when it begins to cool add fresh horse droppings which have been previously sweetened. This manure bed is a good place to start pot vines in, half plunging the pots in it, putting two bricks under each pot to prevent them getting too hot. The evaporating trays should be kept filled with water, and the vines be kept regularly syringed. The border should be examined carefully, and if dry give water, at a temperature of 90 deg. This should be done before the manure is brought in. Cover the outside borders of vines that are to be forced with a foot thickness of leaves to prevent the borders becoming frozen during the winter. Oak or beech leaves are best for this purpose, and a covering of long manure will prevent the leaves from blowing about. This is a good time to add new sections to borders, either inside or out, if the parts previously made have become filled with roots.

**December.**—Cut and bottle as many grapes as room can be found for, leaving the latest keeping ones until the last. Houses in which all the grapes are cut should be at once cleaned, and the vines thoroughly brushed with the compound previously mentioned, working it into all the crevices and around the spurs and buds. Paint the pipes with linseed oil and lampblack mixed together; this is better than ordinary paint, giving off no injurious fumes. Continue to watch closely for decayed berries both in the vineries and in the grape-room. Keep the temperature as near 45 deg. as possible. It will be much better if this temperature can be maintained without artificial heat in the grape-room. As soon as the earliest vines commence to grow, the night temperature must be gradually raised to 60 deg. by the time the bunches are visible, with a day temperature of 75 deg. when the

weather is bright. Keep an abundance of moisture, and syringe in the afternoon of bright days at closing time until the vines come into flower. Rub off all weak shoots which are not wanted as soon as they are formed, leaving only the two strongest shoots to grow, and one of these must be removed as soon as it can be seen which has the best bunch of grapes. Vines should now be started to have grapes ripe in May. Examine the inside border, and if dry give sufficient watering to moisten the whole border, but it must not be kept too wet early in the season. Depress the rods a little below the horizontal line to secure a regular break. Make a hotbed inside, as advised last month. Cover the outside border with manure and leaves, or thatch with straw to keep out the cold. Vines cannot be expected to succeed if their roots are in frozen ground, when the vines are in full leaf and growth. If any part of the stems are exposed outside the house they must be covered up with straw or fern. Inside borders of mid-season or later grapes should have the soil taken off down to the roots, and replaced with fresh turfy soil, mixed as advised for September.





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